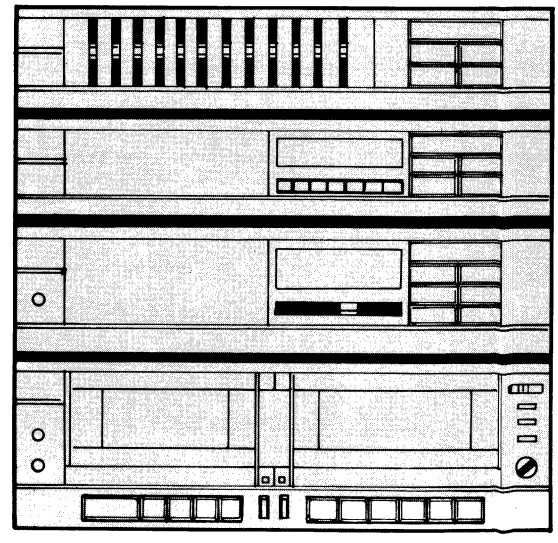
GoldStar

COMPONENT SYSTEM

SERVICE MANUAL

CAUTION
BEFORE SERVICING THE CHASSIS, READ THE "SAFETY PRECAUTIONS", IN THIS MANUAL

MODEL: GSA-5220
GST-5220
GSW-5220
GSQ-5220



MODEL: CS-5220

GoldStar

CONTENTS

GSA–5220

SPECIFICATIONS 3
BLOCK DIAGRAM 4
SCHEMATIC DIAGRAM 5
PCB LAYOUT 6
WIRING DIAGRAM 8
EXPLODED VIEW 9
REPLACEMENT PARTS LIST
- ELECTRICAL 10
- CABINET 11

GST –5220

SPECIFICATION 13
ADJUSTMENT 14
BLOCK DIAGRAM 18
SCHEMATIC DIAGRAM 19
PCB LAYOUT 20
WIRING DIAGRAM 21
EXPLODED VIEW 22
REPLACEMENT PARTS LIST
- ELECTRICAL 23
- CABINET 24

GSW–5220

SPECIFICATIONS 26
ADJUSTMENT 27
STANDARD MAINTENANCE 32
BLOCK DIAGRAM 33
SCHEMATIC DIAGRAM 34
PCB LAYOUT 35
WIRING DIAGRAM 36
EXPLODED VIEW
- CABINET 37
- DECK MECHANISM 38

REPLACEMENT PARTS LIST
- ELECTRICAL 39
- CABINET 40
- DECK MECHANISM 42

GSQ–5220

SPECIFICATIONS 44
BLOCK DIAGRAM 45
SCHEMATIC DIAGRAM 46
PCB LAYOUT 47
WIRING DIAGRAM 48
EXPLODED VIEW 49
REPLACEMENT PARTS LIST
- ELECTRICAL 50
- CABINET 50

SAFETY PRECAUTION

Many Electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual, electrical components having such features are identified by a ⚠ in the schematic diagram and the parts list. Before replacing any of these componets, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

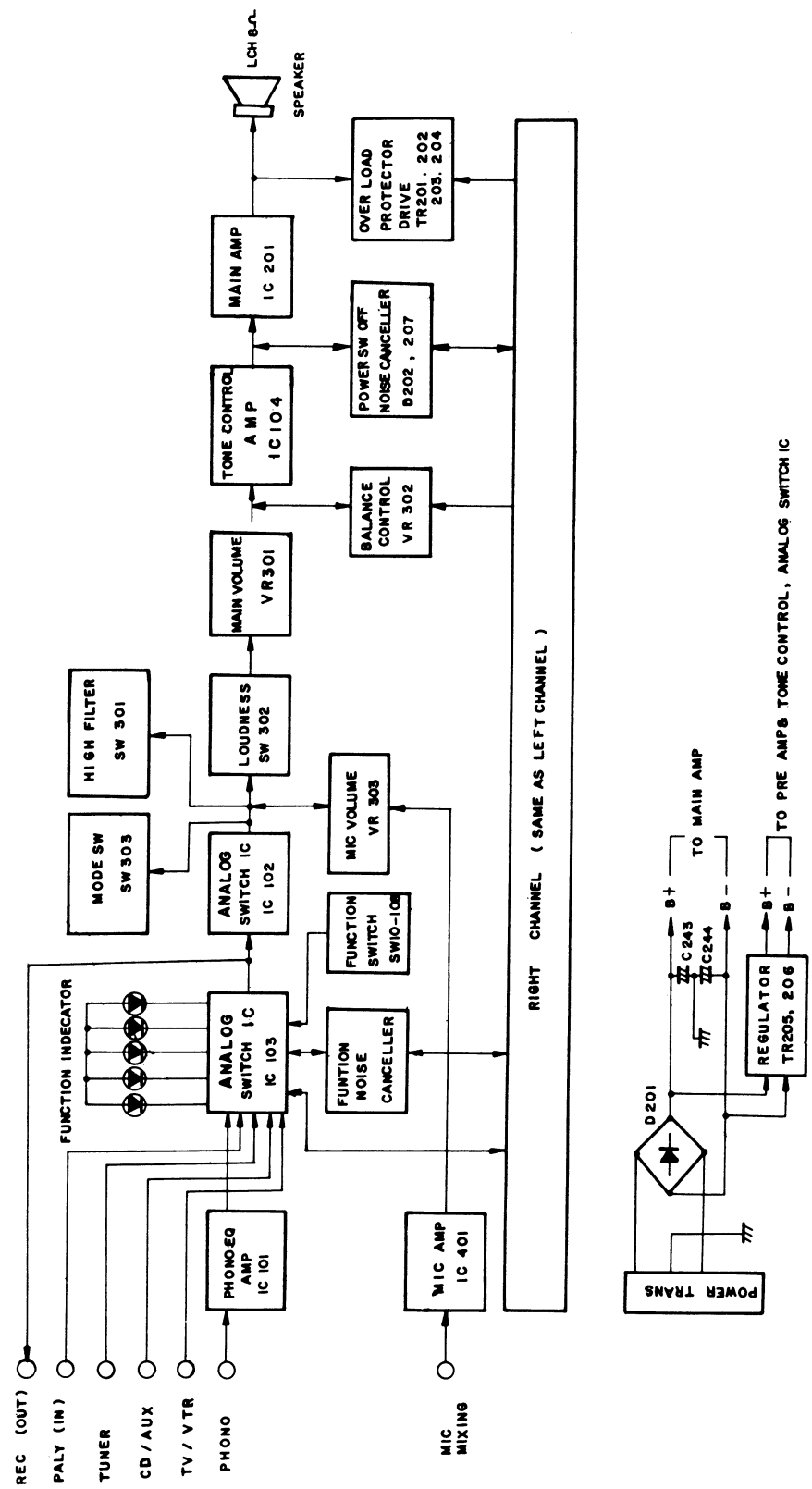
STEREO AMPLIFIER

MODEL: GSA-5220

SPECIFICATIONS

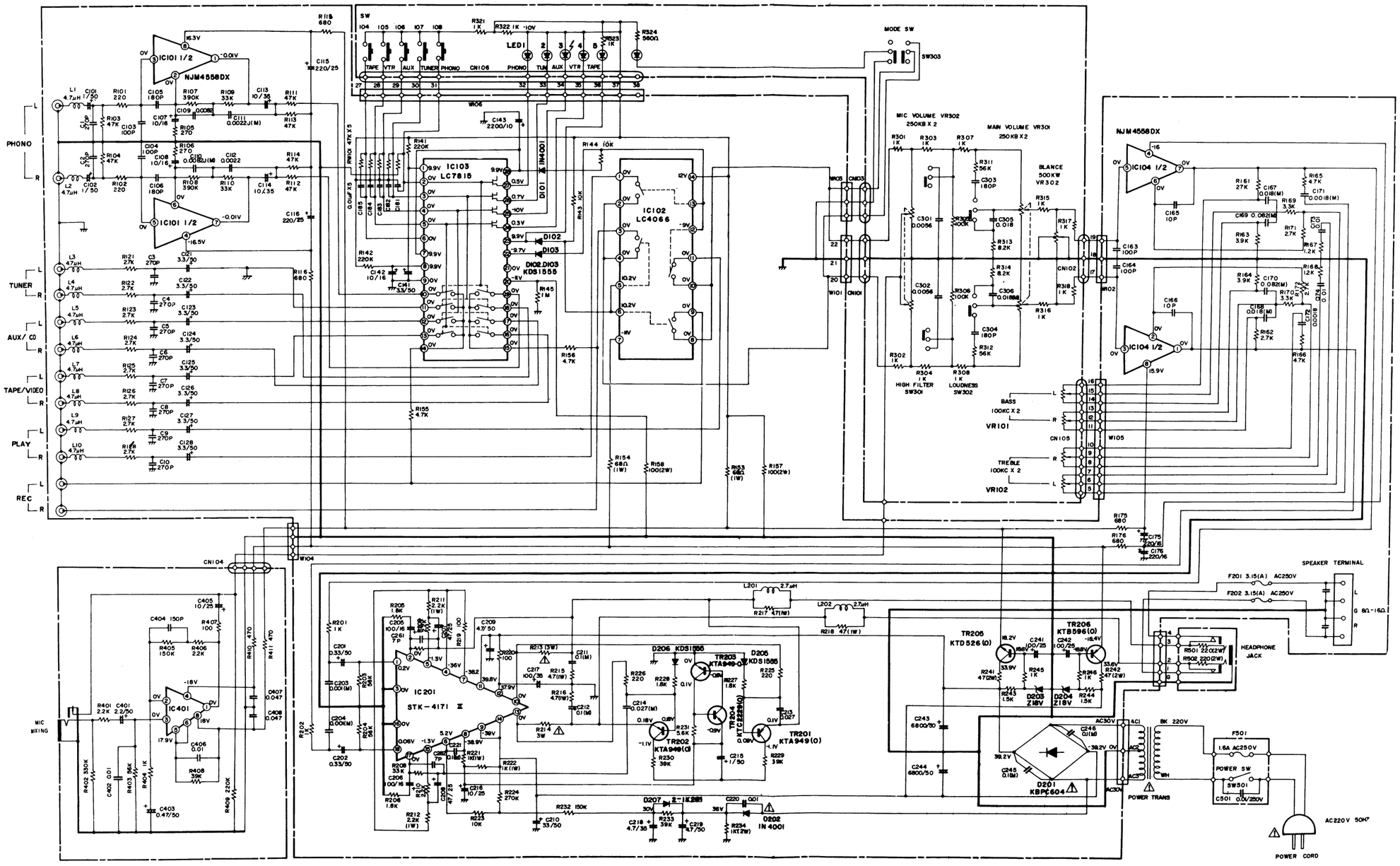
Output (0.08% THD, 1KHz, Load 8Ω)	42W
Power Bandwidth	10Hz ~ 30KHz
T.H.D.	0.03%
Intermodulation Distortion	0.03%
Frequency Response (Output 1W, –3dB)	10KHz ~ 40KHz
S/N ratio	Phono: 70dB, Tuner/AUX/Tape: 95dB
Cross Talk	100Hz: 45dB, 1KHz: 45dB, 10KHz: 40dB
Tone Control	Bass=100Hz: 10dB, Treble=10KHz: 10dB
Input Sensitivity	Phono: 2.5mV, Tape: 150mV, AUX: 150mV
Input Impedance	Phono/Tape/AUX: 47KΩ
Loudness	100Hz: 8.5dB, 10KHz: 5.5dB
Filter	10KHz: –10dB
Power Supply	AC220V, 50Hz

BLOCK DIAGRAM



SCHEMATIC DIAGRAM

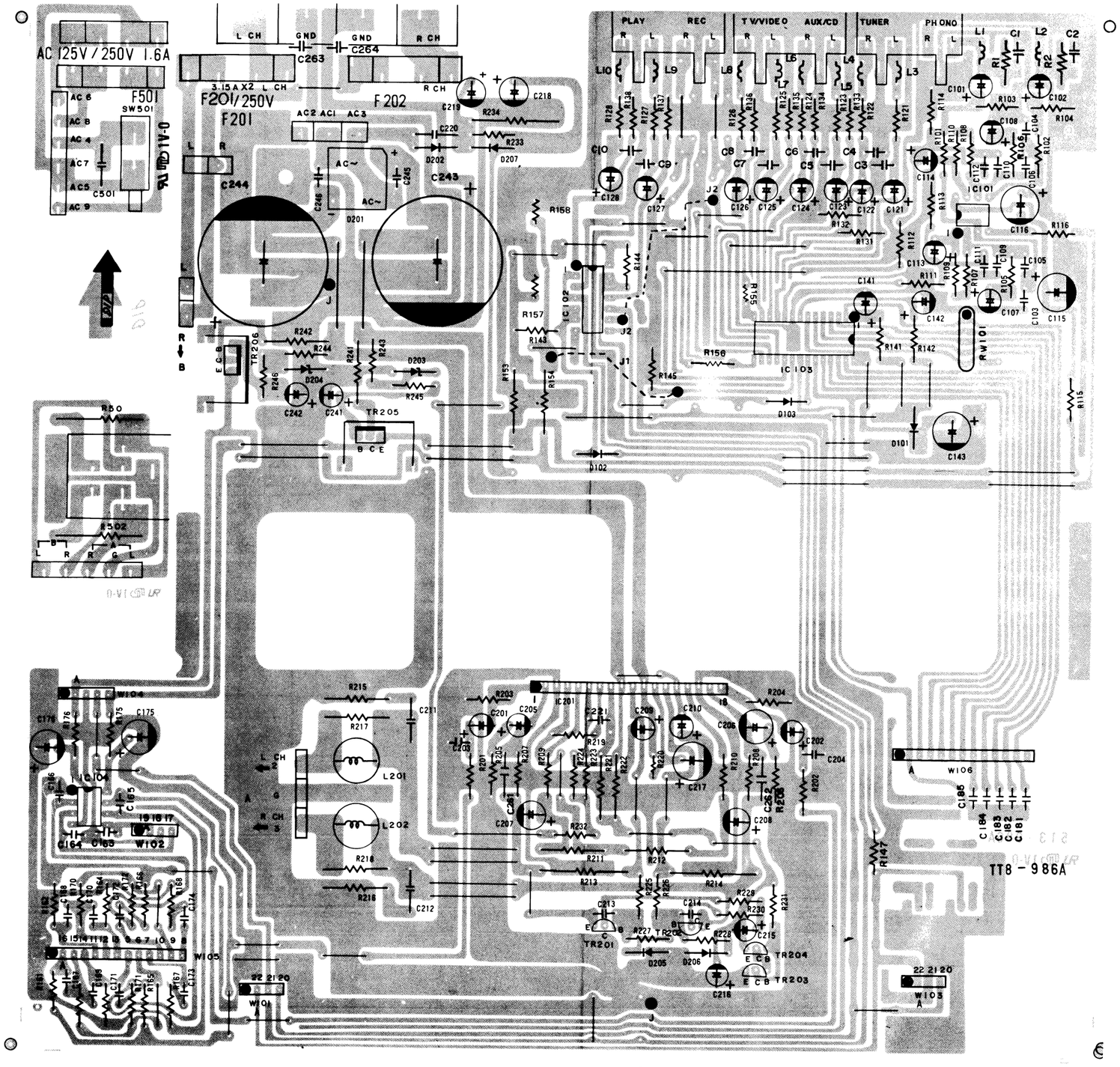
- GSA-5220



NOTES:
1. SI01 – SI08 SWITCH POSITION OFF.
2. ALL RESISTANCE VALUES ARE INDICATED IN "OHM" (K=10³ OHM, M=10³ OHM)
3. ALL CAPACITANCE VALUES ARE INDICATED IN "μF" = 10⁻⁶, P = 10⁻¹²μF
4. THE PARTS WITH EXCLAMATION MARK ⚠ IN THE CIRCUIT DIAGRAM ARE KEY PARTS SAFETY REGULATION.
5. THIS SCHEMATIC DIAGRAM BE CHANGED WITHOUT NOTICE FOR IMPROVEMENT OF PERFORMANCE.

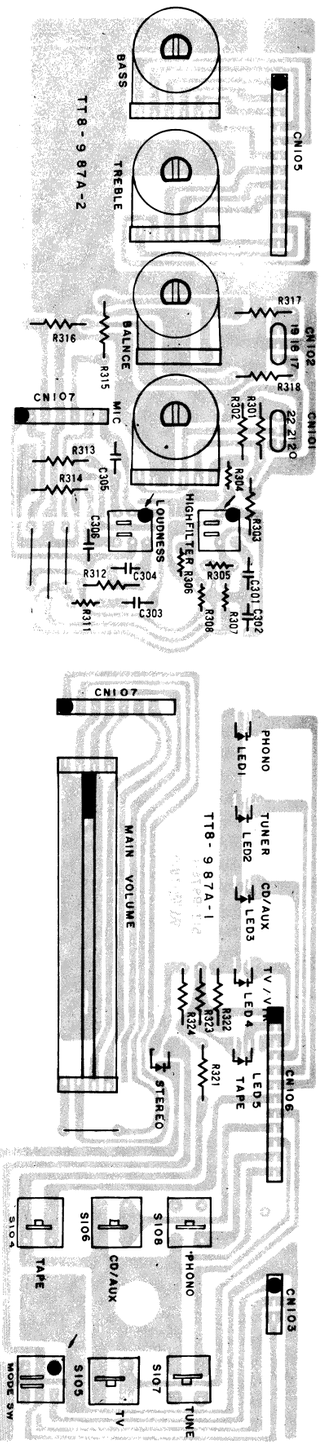
PCB LAYOUT

● MAIN AMP P.C.BOARD

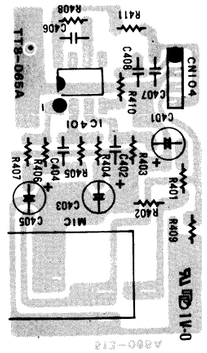


NOTES

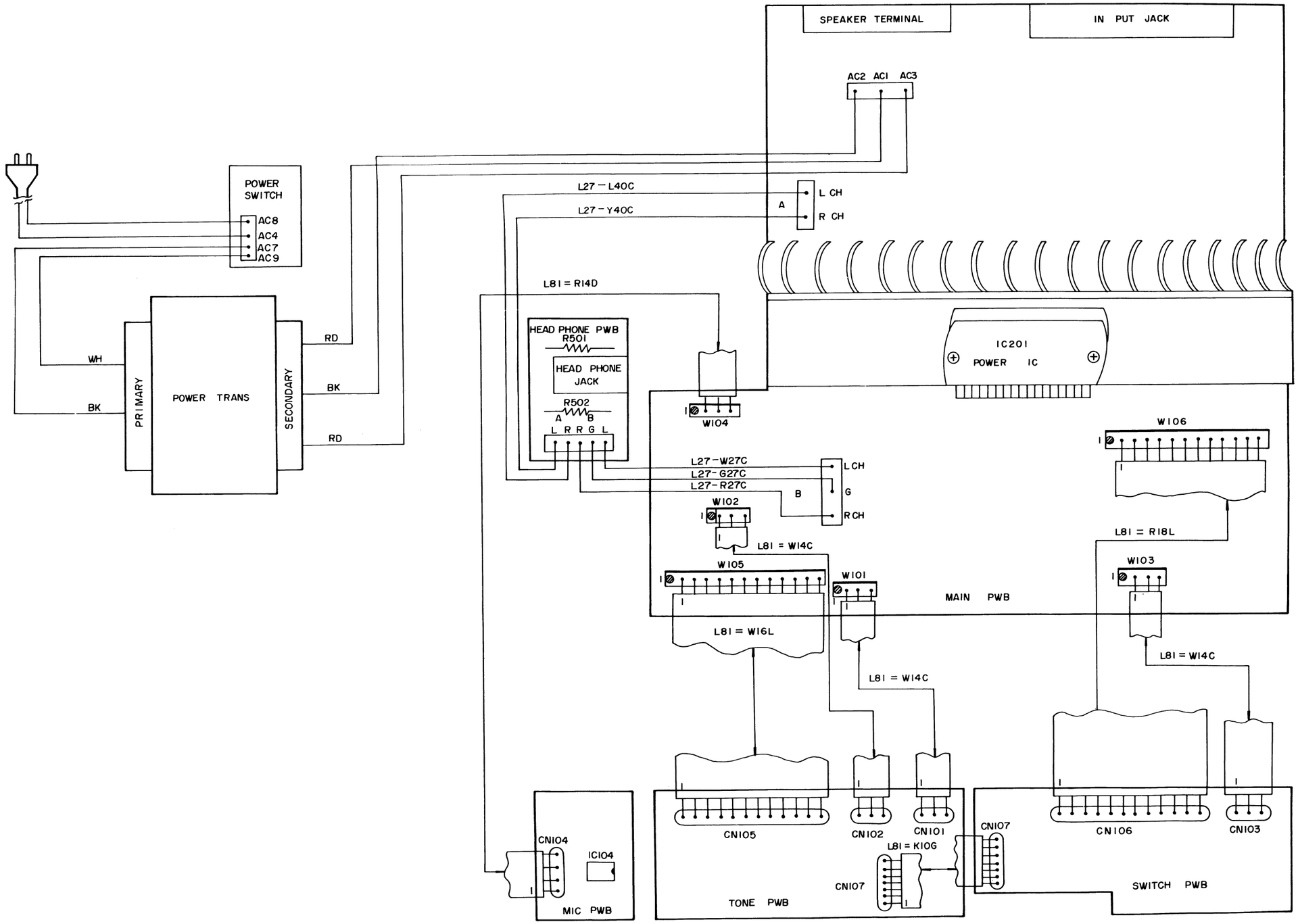
• SUB CONTROL P. C. BOARD



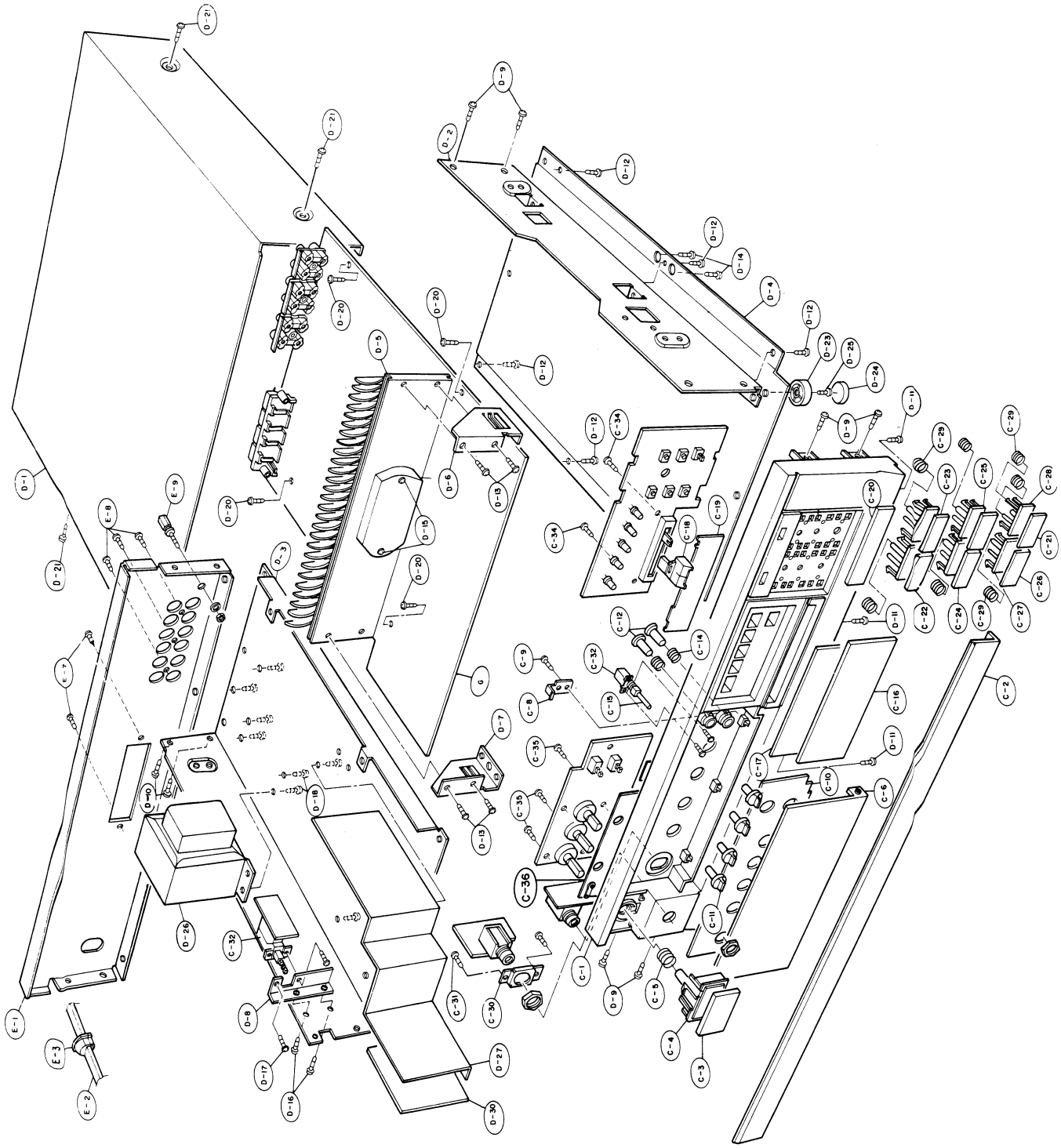
• MIC AMP P. C. BOARD



WIRING DIAGRAM



EXPLODED VIEW



REPLACEMENT PARTS LIST

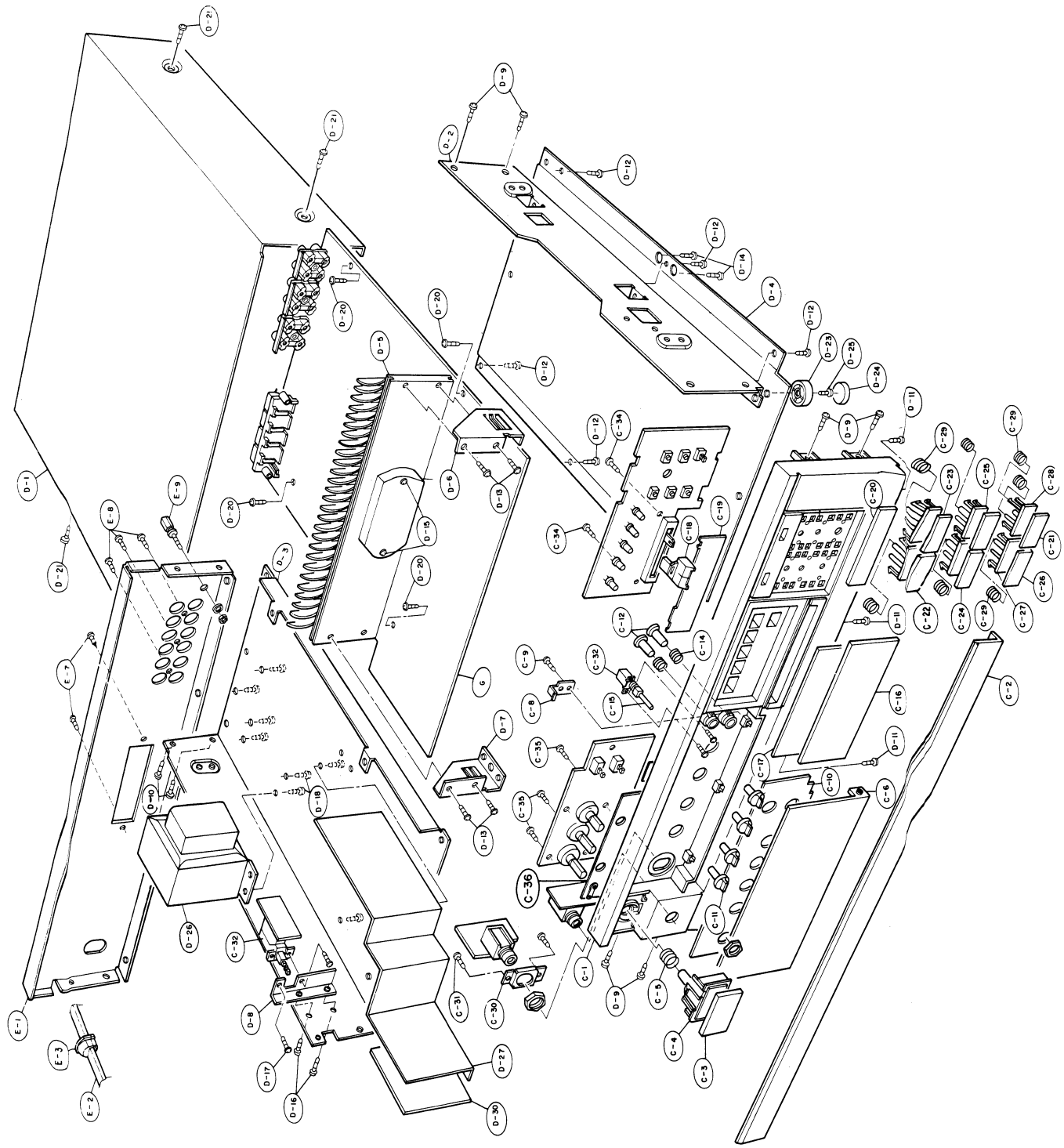
PRODUCT SAFETY NOTICE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the safety precaution of this service manual, don't degrade the safety of the receiver through improper servicing.

• ELECTRICAL

Location No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	668-051D	IC, KA4558-OP AMP
IC102	668-662A	IC, LC4066-Analog SW
IC103	668-661A	IC, LC7815-Analog SW
IC104	668-051D	IC, KA4558-OP AMP
IC201 ⚠	668-414C	IC, STK4171-Power
IC401	668-051D	IC, KA4558-OP AMP
TRANSISTORS		
TR201	666-421A	TR, KTA939-O
TR202	666-421A	TR, KTA949-O
TR203	666-421A	TR, KTA949-O
TR204	665-834A	TR, KTC2229-O
TR205	665-708A	TR KTD526-O
TR206	664N418A	TR, KTB596-O
DIODES		
D101	652-005C	Rect, DS4001
D102	652-015B	Switch, KDS1555
D103	652-015B	Switch, KDS1555
D201	652-611A	Rect, KBPC604
D202	652-005C	Rect, DS4001
D203	654-725A	Zener, DZW18
D204	654-725A	Zener, DZW18
D205	652-015B	Switch, KDS1555
D206	652-015B	Switch, KDS1555
D207	651-001F	Detect, FM 2-1K261
LED1	653-636D	LED, SLR54GC3-P
LED2	653-636D	LED, SLR54GC3-P
LED3	653-636D	LED, SLR54GC3-P
LED4	653-636D	LED, SLR54GC3-P
LED5	653-636D	LED, SLR54GC3-P
LED6	653-636A	LED, SLR54GC3-M
COILS		
L1-10	637-604A	Inductor Fixed 47μH
L201	636-403A	Choke with Core
L202	636-403A	Choke with Core

Location No.	Part No.	Description
SWITCHES AND VOLUMES		
SW101	554-633A	SW, SEA12A, 2P(S) Self-Lock
SW102	554-633A	SW, SEA12A, 2P(S) Self-Lock
SW103	554-633A	SW, SEA12A, 2P(S) Self-Lock
SW104	558-026A	SW, Tact KPT-1105 (T-S-06)
SW105	558-026A	SW, Tact KPT-1105 (T-S-06)
SW106	558-026A	SW, Tact KPT-1105 (T-S-06)
SW107	558-026A	SW, Tact KPT-1105 (T-S-06)
SW108	558-026A	SW, Tact KPT-1105 (T-S-06)
SW501	554-612B	SW, Power Sdlip
VR201	612-618B	VR, Slide S4528GB-250KBx2 L=10
VR202	611-647U	VR, K161BOO-500KW L=25
VR203	611-647V	VR, K162TOG-100KCx2 L=25
VR204	611-647V	VR, K162TOG-100KCx2 L=25
VR205	611-640B	VR, K162TOO-100KBx2 L=25
MISCELLANEOUS		
JT101	576-002A	Jack Block S-437P
JT102	576-002A	Jack Block S-437P
JT103	576-002A	Jack Block S-437P
JT104	561-100B	Speaker Terminal
PJ101	572-059D	Jack D=6.4
PJ101	572-059D	Jack D=6.4 P.HYT60-065
PJ401	572-195D	Jack D=6.4 HLJ0305-01-040
F1, 2	585-512A ⚠ 586-101A ⚠	Fuse 5x20 250V 1.6A Fuse Holder

EXPLODED VIEW



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JT104	561-100B	Speaker Terminal
PJ101	572-059D	Jack D=6.4
PJ101	572-059D	Jack D=6.4 P.HYT60-065
PJ401	572-195D	Jack D=6.4 HLJ0305-01-040
F1, 2	585-512A ⚠ 586-101A ⚠	Fuse 5x20 250V 1.6A Fuse Holder

• CABINET

Location No.	Part No.	Description	Location No.	Part No.	Description
C-1	258-520D	Panel, Front	D-2	315-510A	Frame Side
C-2	246-511T	Panel, Front	D-3	313-510A	Chassis Bottom
C-3	273-529A	Knob Assy, Power	D-4	256-520A	Plate Bottom
C-3-1	273-800A	Knob, Power	D-5	255-510A	Heatsink
C-3-2	324-331A	Holder, Power-Knob	D-6	321-411A	Bracket Heatsink (L)
C-5	442-634X	Spring, Power Knob	D-7	321-411B	Bracket Heatsink (R)
C-6	226-510F	Door, Function	D-8	321-410A	Bracket Power SW
C-8	442-510A	Spring, Door (For Door Eject)	D-9	TRQ1830J	Screw, TRQ2+3x6A (Front+Frame Slide)
C-9	353-025F	Screw, Special (For Fix Spring Door)	D-10	TRQ1830J	Screw, TRQ2+3x6A (Front+Chassis Bottom+ Back)
C-10	246-520B	Deco, Plate Function (A)			
C-11	273-513A	Knob, Rotary	D-11	TCQ1830J	Screw, Tapping TC3+3x6 (Front+ Chassis, Frame, Plate/ Bottom)
C-12	273-514A	Knob, Push			
C-14	442-634W	Spring, Knob Power			
C-15	273-515A	Knob, Open			
C-16	236-510A	Window, Func. Led	D-12	TRQ1830J	TRQ2+3x6A (Plate Bottom+Chassis Frame, Back)
C-17	236-512F	Window, Inner			
C-18	273-526D	Knob, Slide Volume			
C-19	353-025F	Screw, Special	D-13	TRQ1830J	Screw, TRQ2+3x6A (Bracket Heatsink+ Heatsink)
C-20	273-510A	Knob Deco			
C-21	273-511G	Knob Deco Mode			
C-22	273-511B	Knob Deco Phono	D-14	TRQ1830J	Screw, TRQ2+3x6A (Bracket Heatsink+ Chassis, Frame)
C-23	273-511C	Knob Deco Tuner			
C-24	273-511D	Knob Deco CD/Aux			
C-25	273-511E	Knob Deco TV/VTR	D-15	TRQ1846J	Screw, TRQ2+3x20A (IC+Heatsink)
C-26	273-511S	Knob Deco (Tape Mon.)			
C-27	324-510A	Holder Knob (A)	D-16	TRQ1830J	Screw, TRQ2+3x6A (Fix Bracket Power SW)
C-28	324-511A	Holder, Knob (B)			
C-29	442-635B	Spring, Knob			
C-30	321-414A	Bracket Phone Jack	D-17	MRC1830J	Screw (Fix Power SW)
C-31	353-025F	Screw, Special (For Fix Bracket Phone Jack)	D-18	TRQ2241K	Screw TRQ+4x12 WH (Fix Power Trans)
C-32	554-634A	SW, Push Terminal	D-20	TRQ1830J	Screw, TRQ2+3x6A (Fix Main PCB)
C-33	MRC0930J	Screw MRC 2x6 (For Fix Push SW)	D-21	353-633A	Screw, Special (Fix Cabinet-Side)
C-34	353-025G	Screw, Special (For Fix Volume PCB)	D-23	265-027A	Foot (Mould Only)
C-35	353-025G	Screw, Special (For Fix Control PCB)	D-24	472-610B	Felt (Under Foot)
			D-26	641-712C⚠	Trans Power 220V 50Hz
C-37	231-510A	Sheet Led			
C-40	221-999A	Cover Slide Knob	D-27	256-869A	Shield Plate
C-43	292-020A	Tube PVC	D-28	TRQ1830J	Screw, TRQ2+3x6A (For Fix Shield Plate)
D-1	213-510A	Cabinet			

Location No.	Part No.	Description	Location No.	Part No.	Description
D-31	447-606P	Cushion	E-7	TRQ1839I	Screw, TRQ253x10A FBK (For Fix Speaker Terminal)
D-32	TBQ1830J	Screw, TBQ+3x6 (Back+Frame Side)			
D-33	TBQ1830J	Screw, TBQ+3x6 (Chassis Bottom+Back)	E-8	TRQ1839I	Screw, TRQ253x10A
			E-9	353-055A	Screw, Special
E-1	258-981F	Panel Back	G	511-986M	PCB Ass'y Main, Amp
E-2	681-004F	Power Cord	H	511-987K	PCB Ass'y Sub Control
E-3	324-348A	Holder, Cord	I	511-065A	PCB Ass'y Mic Amp

MW/LW/FM STEREO TUNER
MODEL: GST-5220

SPECIFICATIONS

- **MW**

Frequency Range	522 ~ 1.611KHz
Usable Sensitivity (S/N 20dB)	594, 1008, 1404KHz: 300μV/m
Image Rejection Ratio	594, 1404KHz: 40dB
IF Rejection Ratio	594KHz: 50dB
Selectivity	1008KHz: 40dB
S/N Ratio	1008KHz: 50dB
Distortion (30% Mod.)	1008KHz: 1%
Audio Frequency Response (-6dB)	594KHz: 70 ~ 2300Hz
Output Voltage (80% MOd.)	1008KHz: 500mV

- **FM**

Frequency Range	87.5 ~ 108MHz
Sensitivity (75KHz Dev., S/N 26dB)	90, 98, 106MHz: Mono=0.8μV, Stereo=35μV
S/N Ratio (Unweighted)	98MHz: Mono=70dB, Stereo=65dB
Image rejection ratio	90, 106MHz: 90dB
IF rejection ratio	90MHz: 100dB
Distortion	98MHz: Mono=0.2%, Stereo=0.3%
Audio Frequency Response (-3dB)	20 ~ 16,000Hz
Stereo Separation	98MHz: 40dB
Output Voltage (75KHz Dev.)	98MHz: 600mV

- **LW**

Frequency Range	155 ~ 353KHz
Usable Sensitivity	164, 200KHz 400μV/m
Image Rejection Ratio	164, 254KHz: 35dB
IF Rejection Ratio	200KHz: 40dB
Selectivity	200KHz: 40dB
S/N Ratio	200KHz: 50dB
Audio Frequency Response (-6dB)	150KHz: 70 ~ 2,500Hz

ADJUSTMENT

EQUIPMENT NEEDED:

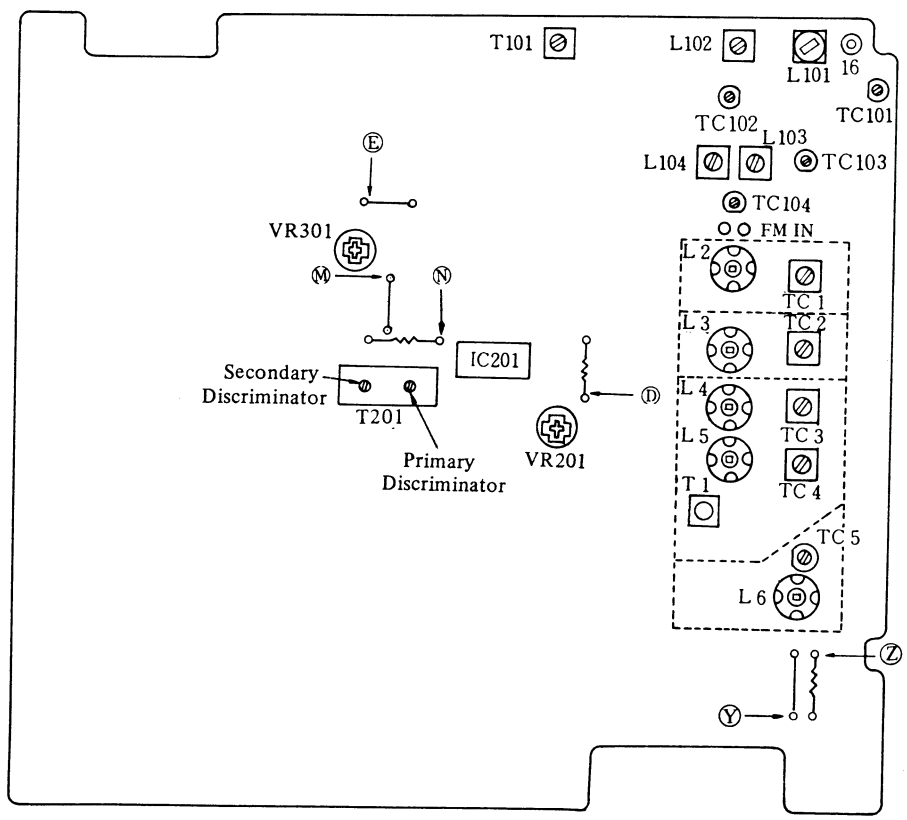
1. AM Signal Generator
2. FM Signal Generator
3. AM/FM IF Genescope
4. Oscilloscope
5. VTVM
6. Test loop antenna (MW Adjustment)
7. Dummy antenna (FM Adjustment)
8. Stereo signal modulator
9. Frequency counter

IMPORTANT

1. Check power-source voltage.
2. Set the function switch to band being aligned.
3. Keep the signal input as low as possible to adjust accurately.
4. Modulation and modulation frequency:

Band / Item	Modulation	Modulation frequency.
MW/LW	1 KHz	30%
FM	1 KHz	100% (75 KHz Dev.)

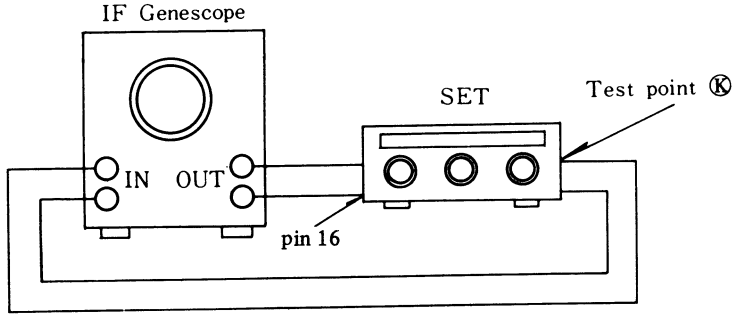
TEST AND ADJUSTMENT POINT



MW/LW IF ADJUSTMENT

IF Genescope . . . . . The input connects to the test point " Ⓚ ", the output connects to pin 16.

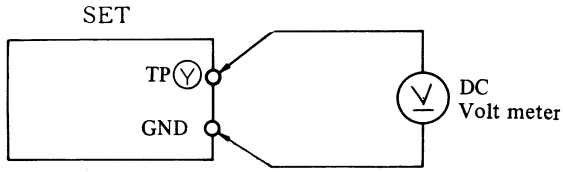
Adjust for the IF wave form of Genescope to be maximum.



IF	Adjust for	Adjustment
450 KHz	Maximum	T101

MW COVER RANGE ADJUSTMENT

DC Volt Meter . . . . . Connect to test point Ⓨ and GND.

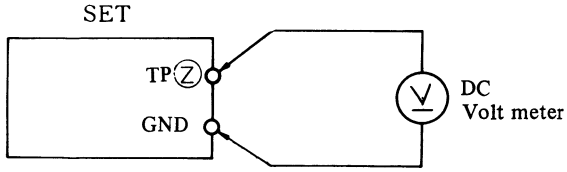


(Cover range alignment connection diagram)

NO.	Frequency	Adjust for	Adjustment
1	522 KHz	2V	L104
2	1622 KHz	24.5V	TC104
3	Repeat steps 1 and 2 several times		

LW COVER RANGE ADJUSTMENT

EC Volt Meter . . . . . Connect to test point Ⓩ and GND.



(Cover range alignment connection diagram)

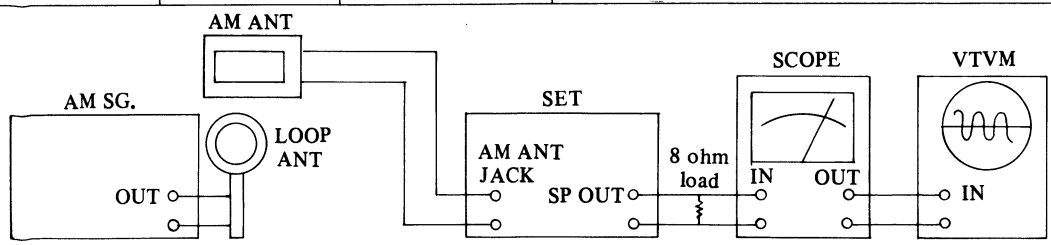
NO.	Frequency	Adjust for	Adjustment
1	155 KHz	8V	L103
2	353 KHz	24.5V	TC103
3	Repeat steps 1 and 2 several times		

MW/LW TRACKING ADJUSTMENT

Signal Generator . . . . . Connects to the MW Ant. Coil through the loop antenna.

Adjust for the indication of VTVM of the wave form of scope to be maximum.

Band	Step	Frequency	Adjust for	Adjustment
MW	1	603 KHz	Maximum sensitivity	L102
	2	1404 KHz	Maximum sensitivity	TC102
	3		Repeat steps 1 and 2 several times	
LW	1	164 KHz	Maximum sensitivity	L101
	2	308 KHz	Maximum sensitivity	TC101
	3		Repeat steps 1 and 2 several times	



FM IF ADJUSTMENT

IF Genescope . . . . . The input connects to the test point " Ⓔ ", the output connect to " Ⓓ ".
DC Volt Meter . . . . . Connect to test point " Ⓜ " and " Ⓝ " (Both side R209).

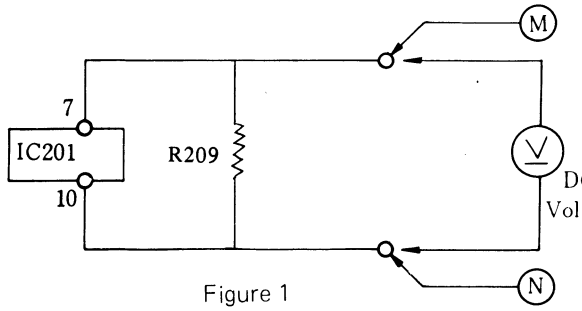
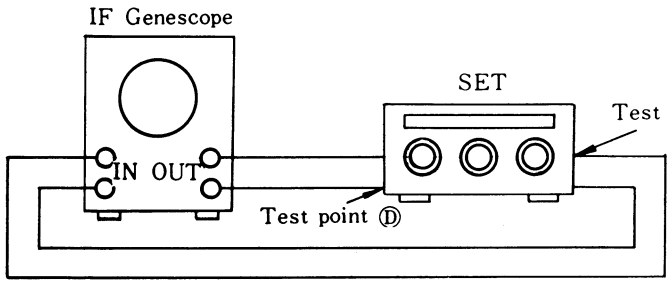


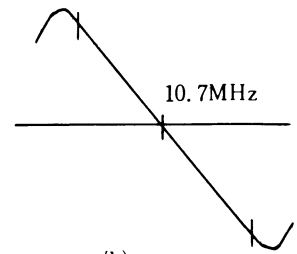
Figure 1

NO.	Adjust for	Adjustment	Remark
1	0V	T201 (Primary)	See figure 1.
2	Maximum linear S curve	T201 (Secondary)	See figure 2-(a), (b)



(a)

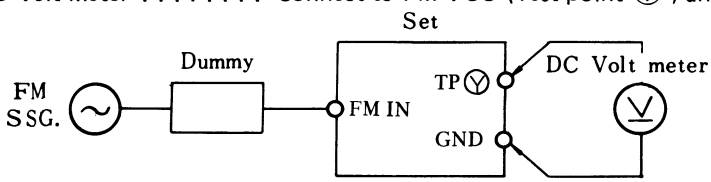
Figure 2



(b)

FM RF (Cover range & Tracking)

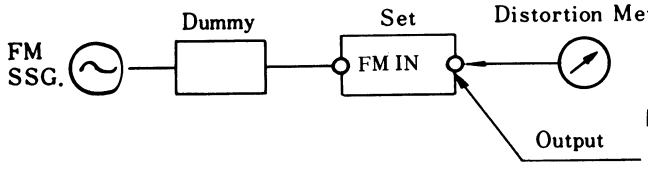
Signal Generator . . . . . Connect to FM Ant Jack (FM IN) through the dummy.
DC Volt Meter . . . . . Connect to FM VCO (Test point Ⓨ) and GND.



NO.	Frequency	Adjust for	Adjustment
1	87.5MHz	4.0V	L6
2	108.00MHz	22.5V	TC5
3	Repeat steps 1 and 2 several times.		
4	90MHz	Maximum sensitivity	L2, L3, L4, L5,
5	106MHz	Maximum sensitivity	TC1, TC2, TC3, TC4
6	Repeat steps 4 and 5 several times.		

FM T.H.D. ADJUSTMENT

Signal Generator . . . . . Connect to FM Ant Jack (FM IN) through the dummy.
Distortion Meter . . . . . Connect to the output.

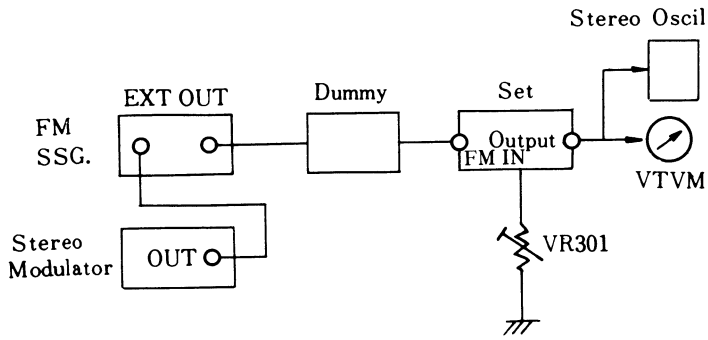


Frequency	Adjust for	Adjustment
98MHz	Minimum T.H.D.	T201 (Secondary)

NOTE: At this time, the DC voltage between the point Ⓜ and Ⓝ should be realized by T201 to keep on 0 voltage, because the "S" curve may be detuned.

(Using Frequency Counter, adjust it's point until indicating 98MHz exactly.)

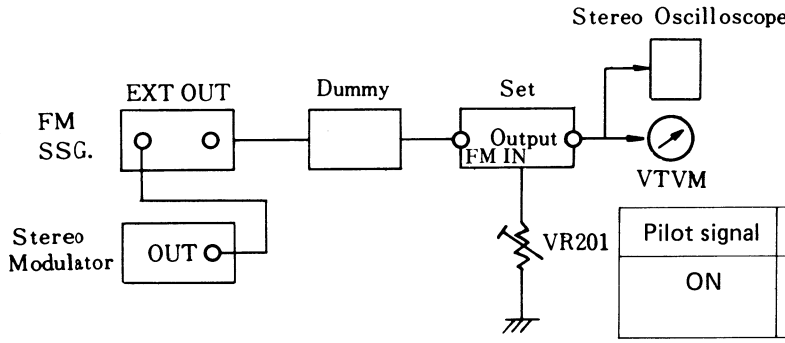
FM MPX ADJUSTMENT – SEPARATION



Pilot Signal	Adjust for	Adjustment
ON	Difference of R and L must be maximum	VR301

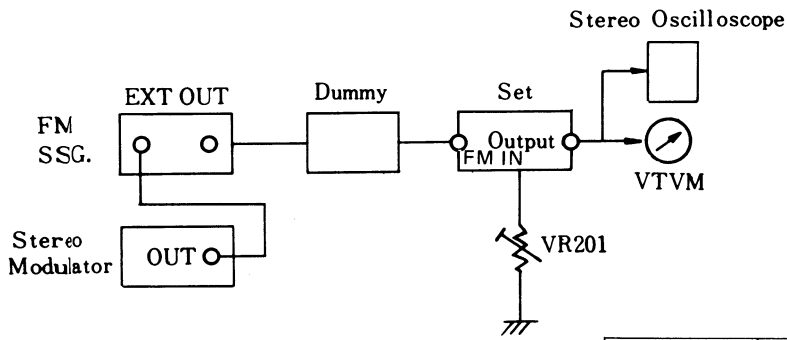
NOTE: In case of adjusting the stereo separation, if input is L (or R) channel, R (or L) channel must be maximum.

FM STEREO BEACON SENSITIVITY ADJUSTMENT



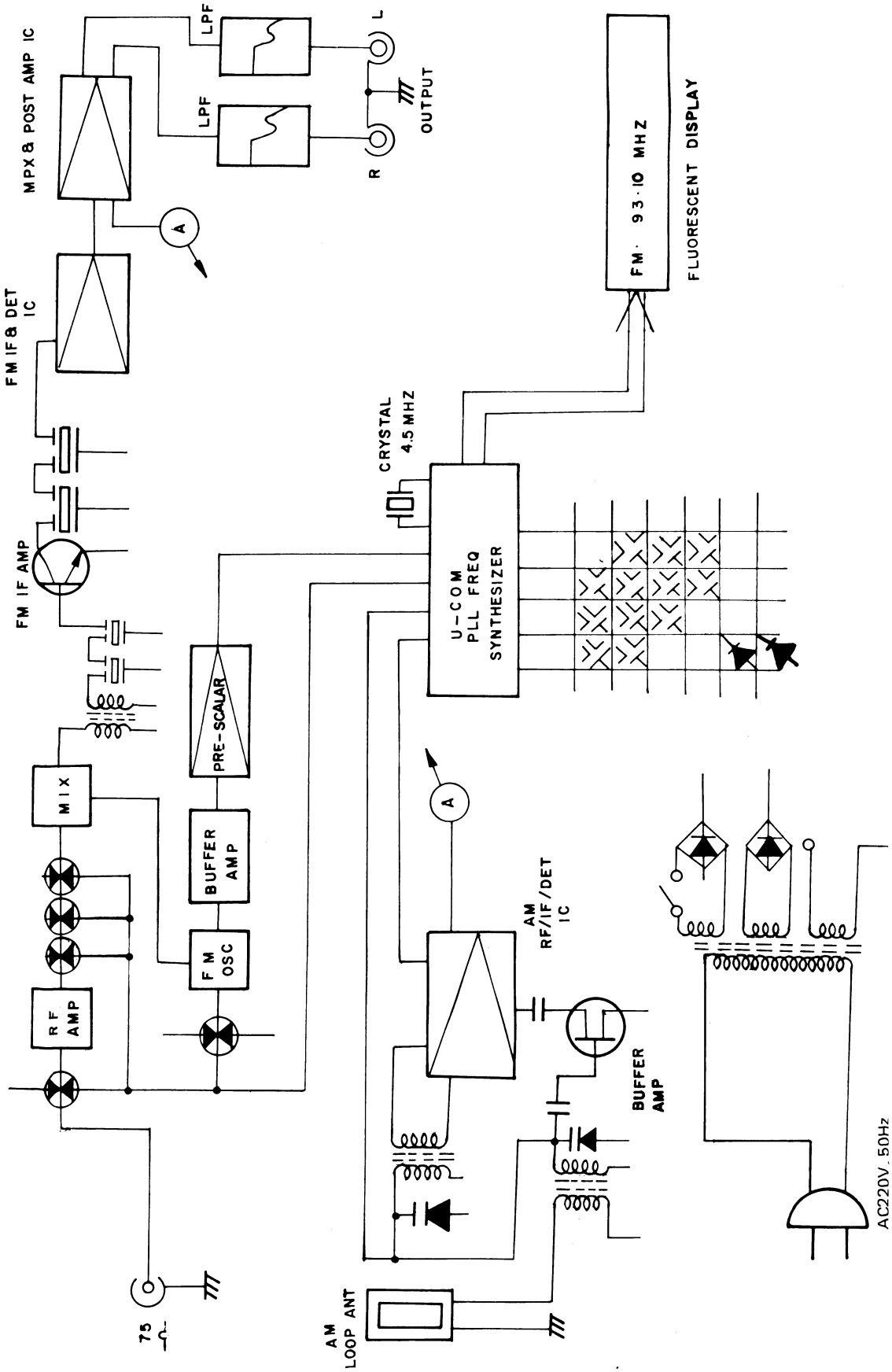
Pilot signal	Input of FM IN	Adjust for	Adjustment
ON	6μV	ST LED lamp -ON	VR201

AUTO SEARCH LEVEL ADJUSTMENT



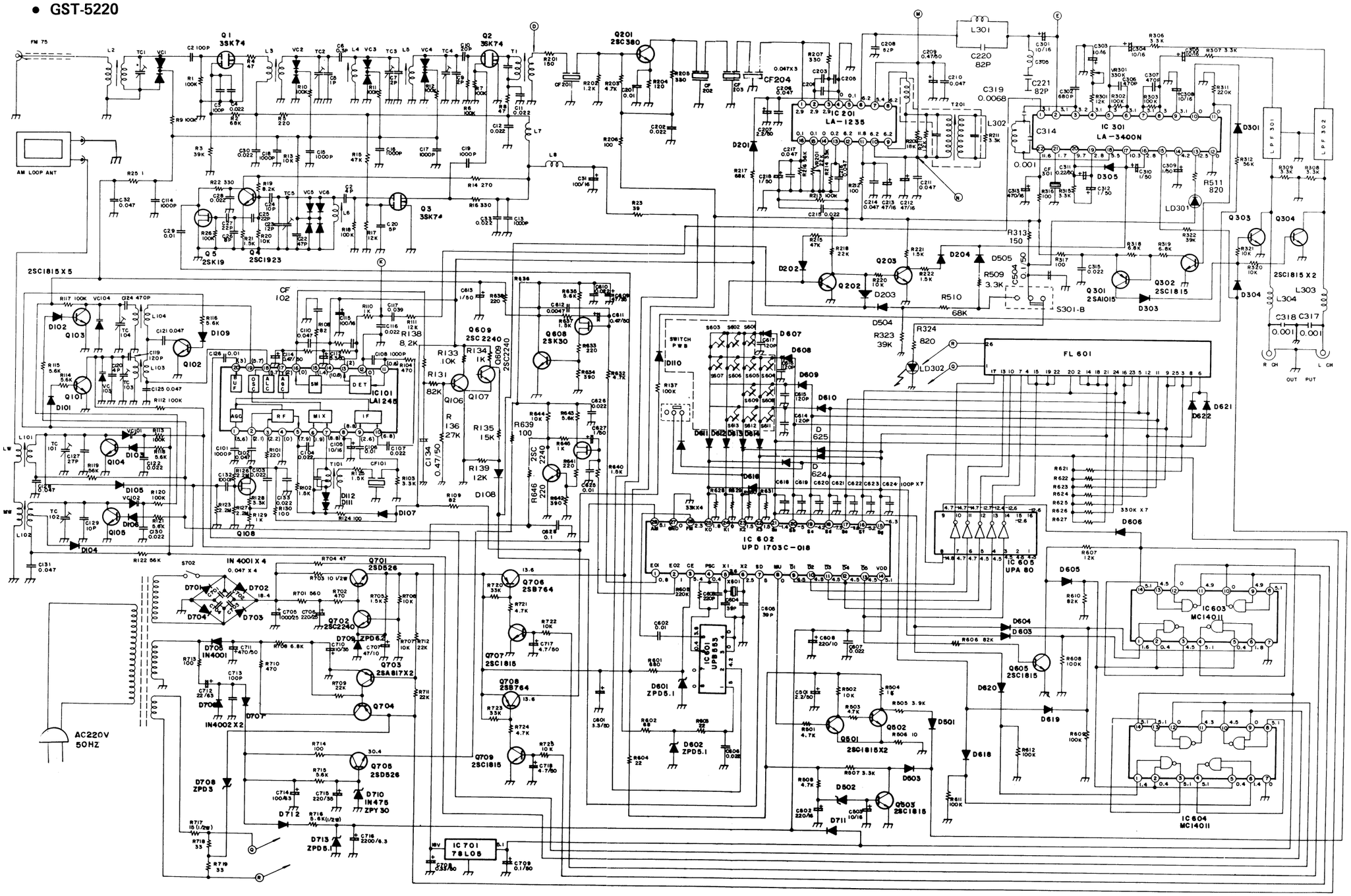
Pilot signal	Input of FM IN	Adjust for	Adjustment
ON	10μV	ST LED lamp -ON	VR201

BLOCK DIAGRAM



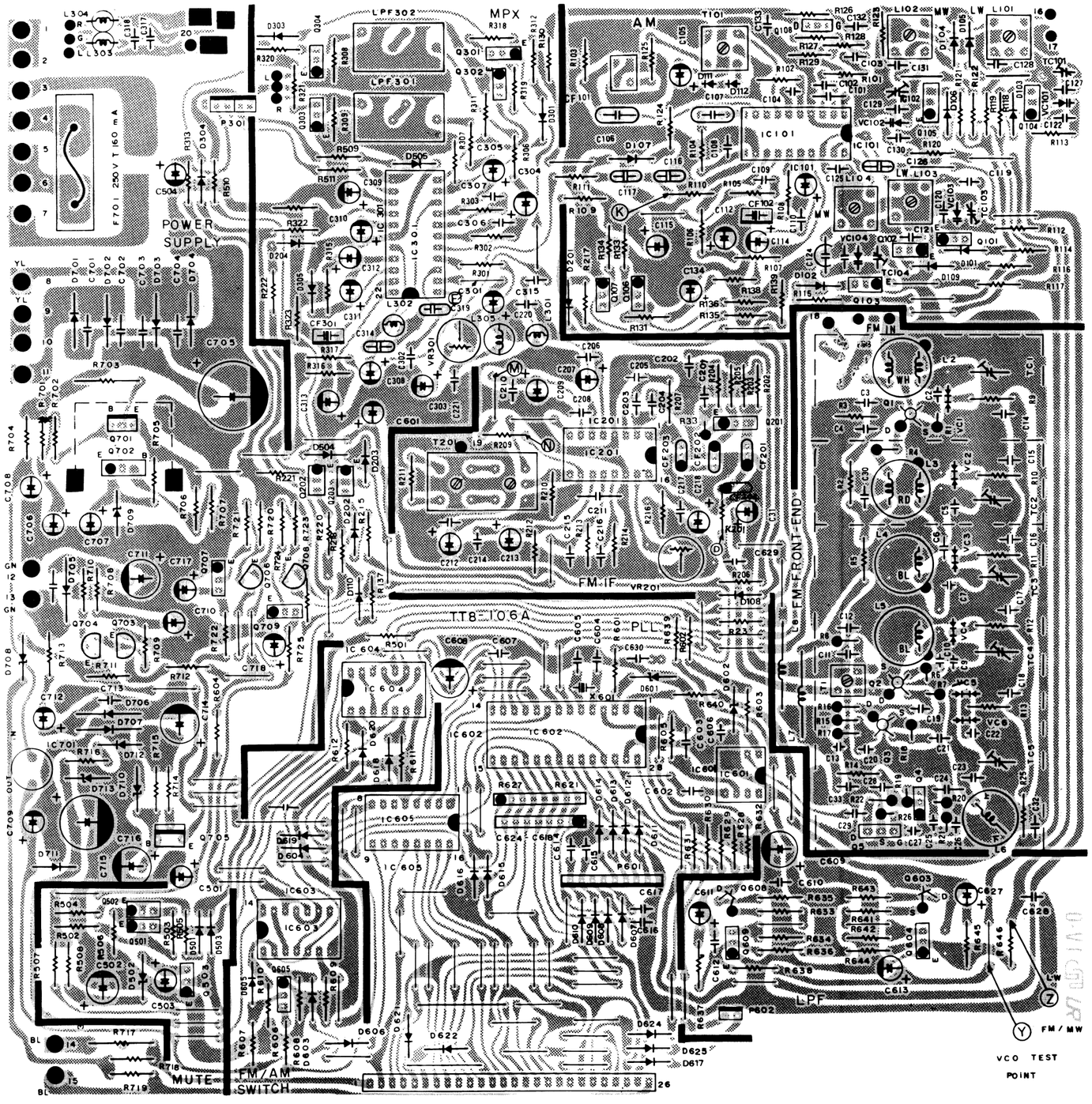
SCHEMATIC DIAGRAM

- GST-5220

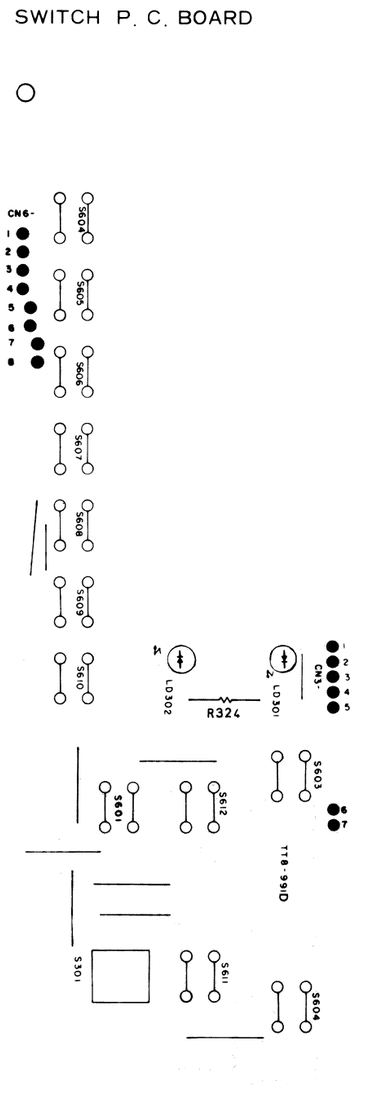


PCB LAYOUT

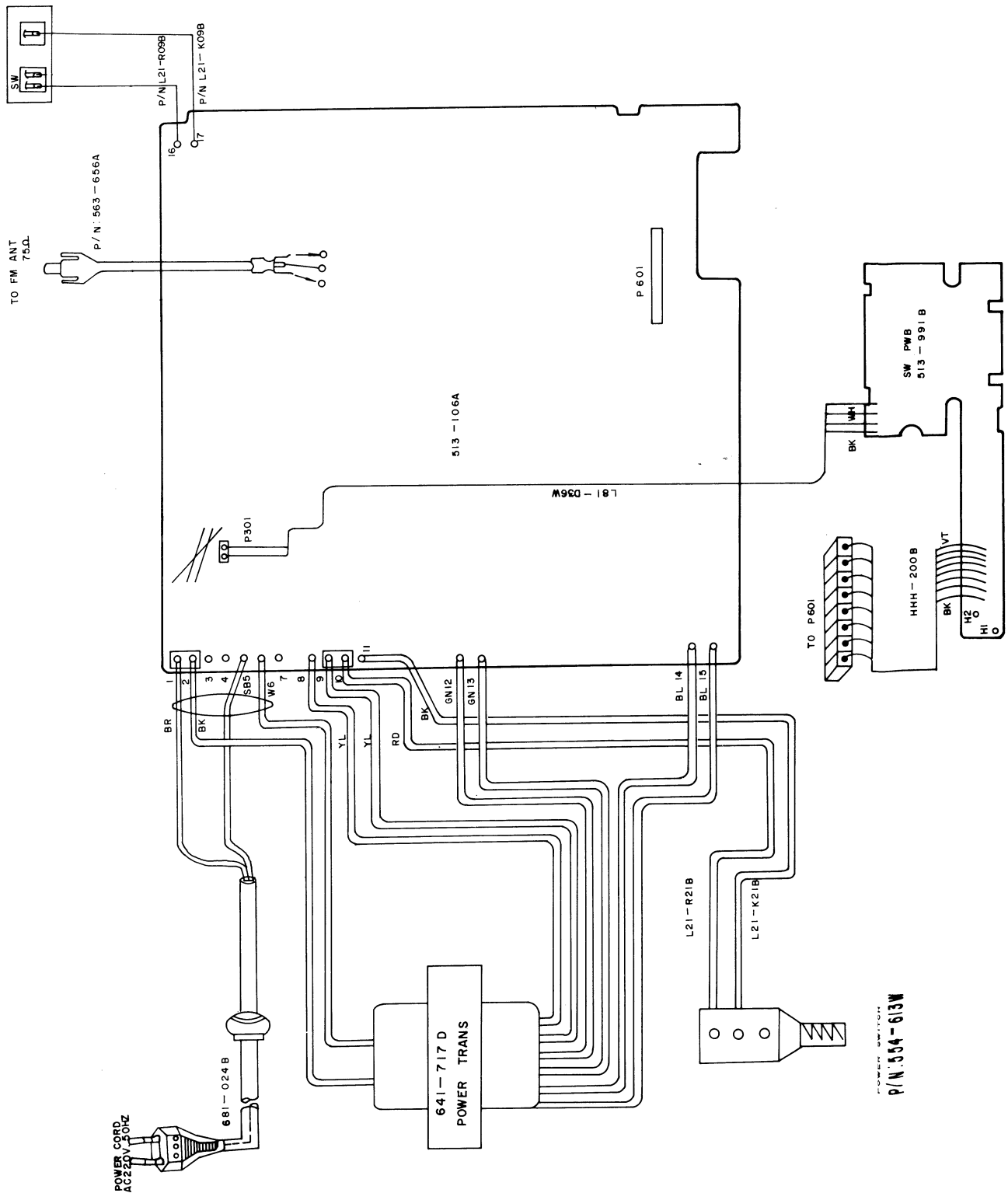
MAIN P. C. BOARD



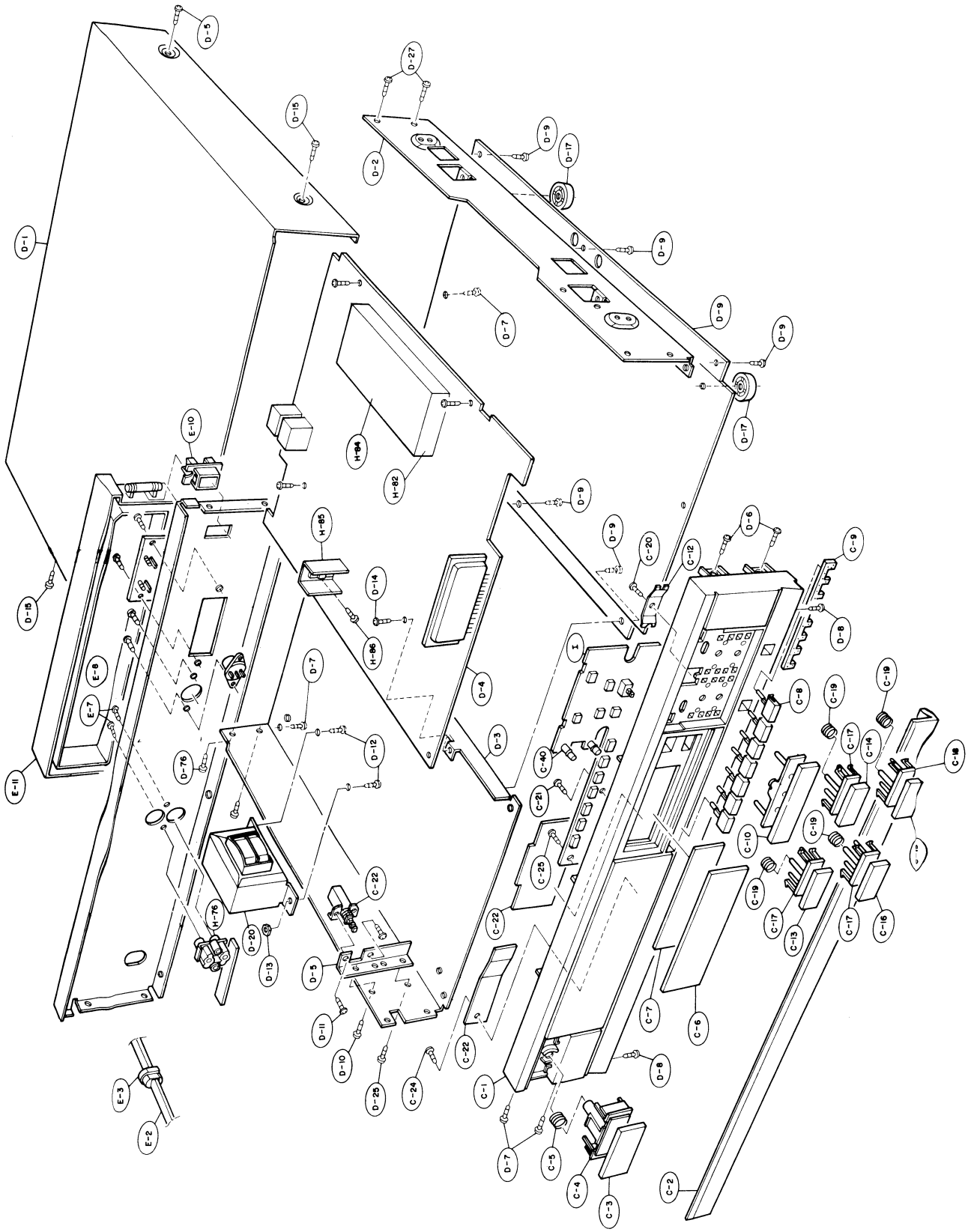
SWITCH P. C. BOARD



WIRING DIAGRAM



EXPLODED VIEW



REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTICE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the safety precaution of this service manual, don't degrade the safety of the receiver through improper servicing.

• ELECTRICAL

Location No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	668-093A	IC, LA1245 (AM IF)
IC201	668-650A	IC, LA1235 (FM IF)
IC301	668-301B	IC, LA3400N (FM MPX)
IC601	668-097A	IC, UPB553AC (Prescalar)
IC602	668-096A	IC, UPD 1703C-016 (FM Synth)
IC603	668-046A	IC, MC14011BCP (Nand Gate)
IC604	668-046A	IC, MC14011BCP (Nand Gate)
IC605	668-680B	IC, UPA80C
IC701	668-044B	IC, UPC78L05J (Regulator)
FETS AND TRANSISTORS		
Q1	667-014A	FET, 3SK74L
Q2	667-014A	FET, 3SK74L
Q3	667-014A	FET, 3SK74L
Q4	665-819B	TR, KTC1923-O
Q5	667-009A	FET, KTK161-Y
Q101-105	665-812B	TR, KTC1815-Y
Q108	667-009A	FET, KTK161-Y
Q201	665-820B	TR, KTC380TM-O
Q202	665-812B	TR, KTC1815-Y
Q203	665-812B	TR, KTC1815-Y
Q301	665-813B	TR, KTA1015-Y
Q302	665-812B	TR, KTC1815-Y
Q303	665-812B	TR, KTC1815-Y
Q304	665-812B	TR, KTC1815-Y
Q501	665-812B	TR, KTC1815-Y
Q502	665-812B	TR, KTC1815-Y
Q503	665-812B	TR, KTC1815-Y
Q603	667-010C	FET, KTK30A-Y
Q604	665-817A	KTC2240-GR
Q605	665-812B	KTC1815-Y
Q608	667-010C	FET, KTK30A-Y
Q609	665-817A	TR, KTC2240GR
Q701	665-708A	TR, KTD526-O
Q702	665-817A	TR, KTC2240 GR
Q703	665-833C	TR, KTA817A-O
Q704	665-833C	TR, KTA817A-O
Q705	665-708A	TR, KTD880-O
Q706	665-600A	TR, 2SB764-E
Q707	665-812B	TR, KTC1815-Y
Q708	665-600A	TR, 2SB764-E
Q709	665-812B	TR, KTC1815-Y
DIODES		
D101-112	652-605B	Diode, Switch 1S2472
D201	652-605B	Diode, Switch 1S2472
D202	652-605B	Diode, Switch 1S2472
D204	652-605B	Diode, Switch 1S2472
D301-305	652-605B	Diode, Switch 1S2472
D501	652-605B	Diode, Switch 1S2472
D502	654-723G	Diode, Zener DZ10B
D503	652-605B	Diode, Switch 1S2472
D601	654-722E	Diode, Zener DZ5.1B
D602	654-722E	Diode, Zener DZ5.1B
D603-622	652-605B	Diode, Switch 1S2472
D701-704	652-005C	Diode, Rect DS4001
D705-707	652-005D	Diode, Rect DS4002
D708	654-722A	Diode, Zener DZ3.0B
D709	654-723B	Diode, Zener DZ6.2B
D710	654-725B	Diode, Zener DZW30
D711	652-605B	Diode, Switch 1S2472
D712	652-605B	Diode, Switch 1S2472
D713	654-608C	Diode, Zener ZD5.1
LD301	653-636A	LED, SLR54UR3C3-M
VC101	654-419A	Diode, Varactor ISV55
VC101-104	655-420A	Diode, Varactor SVC333A
COILS AND TRANSFORMERS		
L2	635-607Z	Coil, FM RF (OSC)
L3	635-607W	Coil, FM RF (OSC)
L4	635-607Y	Coil, FM RF (OSC)
L5	635-607Y	Coil, FM RF (OSC)

Location No.	Part No.	Description
L6	635-607X	Coil, FM RF (OSC)
L7	636-602B	Coil, Choke
L8	636-602B	Coil, Choke
L101	631-606D	Coil, LW Ant
L102	631-606E	Coil, AM ANT
L103	634-602R	Coil, LW OSC
L104	634-602X	Coil, AM OSC
T1	644-610B	Coil, FM IFT
T101	644-601B	Coil, AM IFT
T201	647-606A	Disc Q228CEL-1077B
MISCELLANEOUS		
S601-613	558-026A	SW, Tack KPT-1105
CF101	616-004B	Filter, Ceramic SFP450H
CF201	616-010B	Filter, Ceramic SFE10.7MS3GH RD
CF202	616-010B	Filter, Ceramic SFE10.7MS3GH RD
CF203	616-010B	Filter, Ceramic
CF204		SFE10MS3GH RD
LPF301	639-606A	Low Pass Filter
LPF302	639-606A	Low Pass Filter

Location No.	Part No.	Description
TC1-4	623-025A	Trimmer CTY121B273
TC5	623-026A	Trimmer ECV-1ZW10x31
TC101	623-001A	Trimmer Ceramic TZ03T110F
TC102	623-001A	Trimmer Ceramic TZ03T110F
TC103	623-001C	Trimmer Ceramic TZ03R200F
TC104	623-001A	Trimmer Ceramic TZ03T110F
VR201	613-002D	VR, Semi, Fixed SR19R-22KB
VR301	613-002H	VR, Semi-Fixed SR19R-330KB
X601	617-601D	Crystal 4.5000MAX
FL601	659-016A	Display FIP7G8
JACK1	576-002B	Jack Block S-436P
	691N069A	Ceramic Pillar (For R703)
CF301	616-020C	Resonation Ceramic CSB456F11
R621-627	614-013D	R, Network 330Kx7 RKC1/8B7330KJ
C618-624	614-014A	C. Network 100PF-7

• CABINET

Location No.	Part No.	Description
A-10	564-017E	Cord Phone 700m/m
C-1	258-522D	Panel Front
C-2	246-510B	Decoration Front
C-3-1	273-800A	Knob, Power
C-3-2	324-331A	Holder, Power-Knob
C-5	442-634X	Spring Power Knob
C-6	236-521D	Window Display
C-7	236-522G	Window Inner
C-8	273-516A	Knob Preset
C-9	442-520B	Spring Knob Preset
C-10	273-524C	Knob Decoration
C-12	442-521A	Spring Knob Tuning
C-13	273-511H	Knob Decoration FM
C-14	273-511T	Knob Decoration LW
C-15	273-511U	Knob Decoration Hi-Blend
C-16	273-511V	Knob Decoration Memory
C-17	324-510A	Holder Knob (A)
C-19	442-634G	Spring Knob
C-20	353-025F	Screw, Special (Fix Tuning Knob)
C-21	353-025G	Screw, Special

Location No.	Part No.	Description
C-21	353-025G	Screw, Special (Fix Preset SW PCB)
C-22	236-523A	Window Display Filter
C-23	442-937A	Spring Supporter Digit
C-24	353-025F	Screw Special
C-25	TRQ0936J	Screw (Fix Preset SW PCB)
D-1	213-520A	Cabinet
D-2	315-510B	Frame Side
D-3	313-510C	Chassis Bottom
D-4	256-520B	Plate Bottom
D-5	321-410A	BKT Power SW
D-6	TRQ1830J	Screw, TRQ2+3x6A (Front+Frame Side)
D-7	TRQ1830J	Screw, TRQ2+x6A (Front+Chassis Bottom)
D-8	TCQ1830J	Screw, Tapping TC3+3 x6 (Front+Chassis Bottom)
D-9	TRQ1830J	Screw, TRQ2+3x6A (Plate Bottom+ Chassis Frame Plate

Location No.	Part No.	Description	Location No.	Part No.	Description
D-9	TRQ1830J	Screw, TRQ2+3x6A (Plate Bottom+ Chassis Frame Plate Bottom)	E-2	681-003D⚠	Power Cord
			E-3	324-348A	Holder, Cord
			E-4	573-002B	Socket, Antenna
			E-5	NHA1800J	Nut, NH1-3
D-10	TRQ1830J	Screw, TRQ2+3x6A	E-6	MRC1830I	Screw, MRC+3x6 FBK (Fix Socket Ant)
D-11	MRC1830J	Screw (Fix Power Switch)			
D-12	MRC1836J	Screw, MRC+3+8 (Fix Power Trans)	E-7	TRQ1839I	Screw, TRQ253x10A FBK (Fix RCA Jack)
D-13	NHA1800J	Nut, NH1-3 (Fix Power Trans)	E-8	273-102A	Socket AM Antenna
			E-9	TRQ1836I	Screw, TRQ2+3x8A (Fix Ant Terminal)
D-14	TRQ1830J	Screw, TRQ2+3x6A (Fix Main PCB)	E-10	324-515A	Holder AM Ant
D-15	353-633A	Screw, Special (Fix cabinet-side)	H	511-106A	PCB Ass'y, Main
			H-91	576-002B	Jack Block S-436P (Jack 1, For Output)
D-17	265-027A	Foot (Mould Only)			
D-20	641-717C⚠	Trans Power	H	511-106A	PCB Ass'y, Main
D-22	554-613W	SW, SUF12-S Lead Type (S2, For Power)	H-86	TRQ1836J	Screw, TRQ2+3x8A (For Q701)
D-25	TRQ1822J	Screw, TRQ2+3x4A (Fix Bracket Power SW)	H-87	256-503A	Shield Plate
			H-94	256-449A	Plate, Shield-A
			H-95	256-451A	Plate, Shield-C
D-26	TBQ1830J	Screw, TBQ+3x6 (Chassis Bottom+ Panel Back)	H-96	221-193A	Cover-A Shield Plate
			H-97	255-039A	Plate, Heatsink
			I	511-991C	PCB Ass'y Switch
D-27	TBQ1830J	Screw, TBQ+3x6. (Frame Side+Panel Back)		632-210B	Coil Ant Loop AM 200x50mm
E-1	258-979D	Panel Back			

STEREO DOUBLE CASSETTE DECK
MODEL: GSW-5220

SPECIFICATIONS

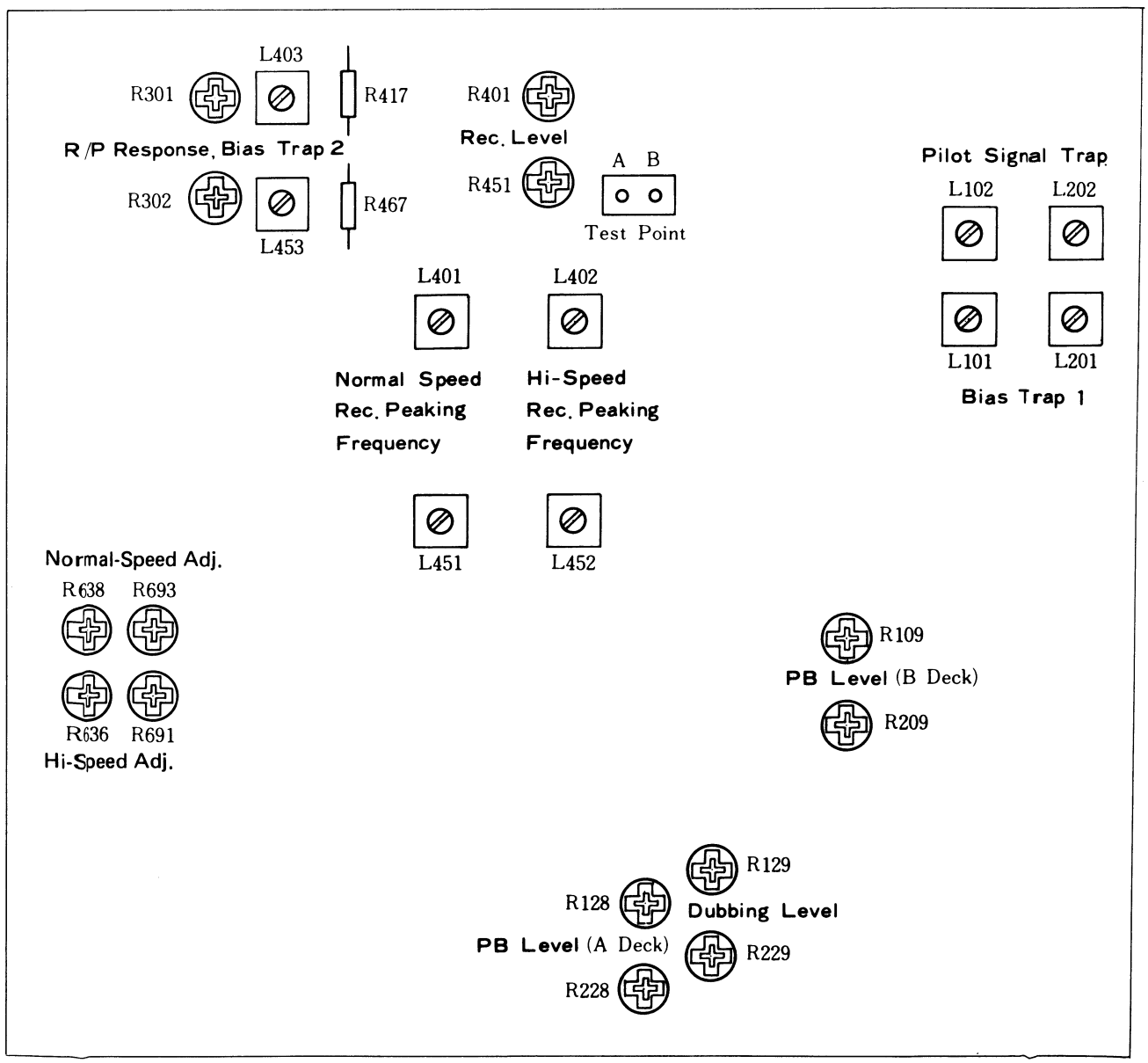
Tape Speed	4.75cm/sec
Wow Flutter (JIS – WTD)	0.1%
F.F. & Rewind Time (C-60)	120sec
Frequency Response	30 ~ 15KHz
S/N Ratio (Dolby off)	P/B: 50dB, R/P: 60dB
T.H.D.	P/B: 1%, R/P: 1.5%
Cross Talk (MTT-121, W/BPF)	60dB
Channel Separation (1 KHz)	P/B: 35dB, R/P: 35dB
Erase Ratio (W/BPF)	65dB
Output Level	0.5V

ADJUSTMENT

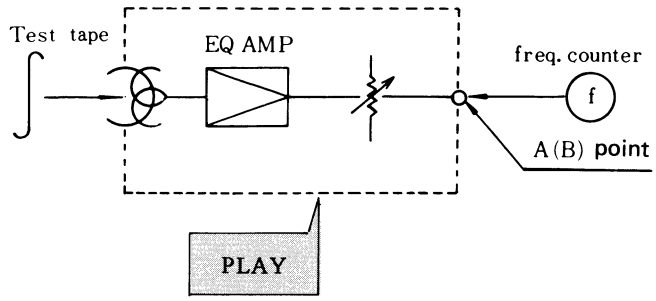
EQUIPMENT NEEDED

1. Audio frequency OSC
2. VTVM
3. Test tape
   a. MTT–114N
   b. MTT–111
   c. MTT–150
   d. MTT–501 (Normal)
   e. CS–26 (CrO_2)
   f. Metalic–4 (Metal)

TEST AND ADJUSTMENT POINT

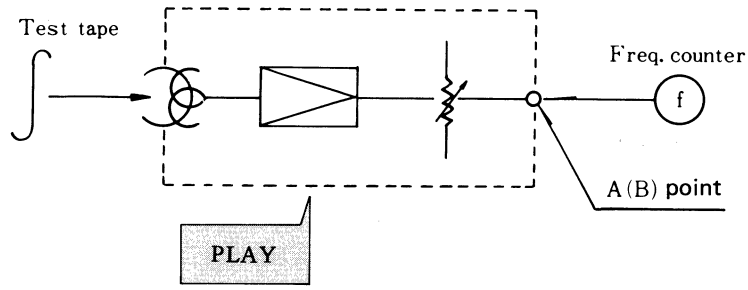


1. AZIMUTH ADJUSTMENT



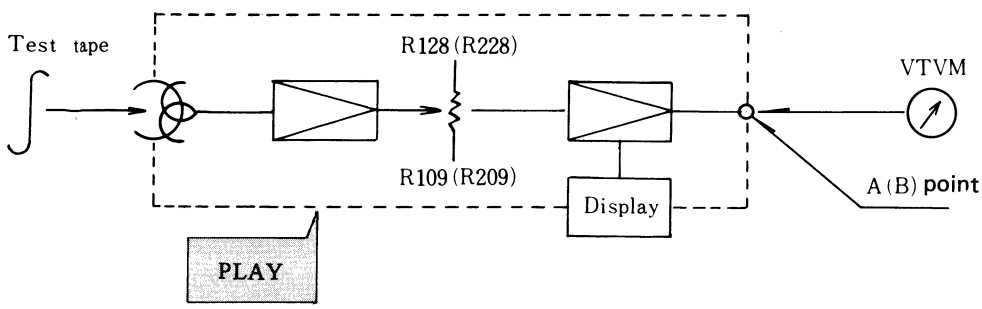
Deck Condition	Test tape	Test point	Adjustment	Adjust for
Play	MTT-114N	A.B point	Head screw	R/L Maximum

2. MOTOR SPEED ADJUSTMENT – Hi speed, Normal speed



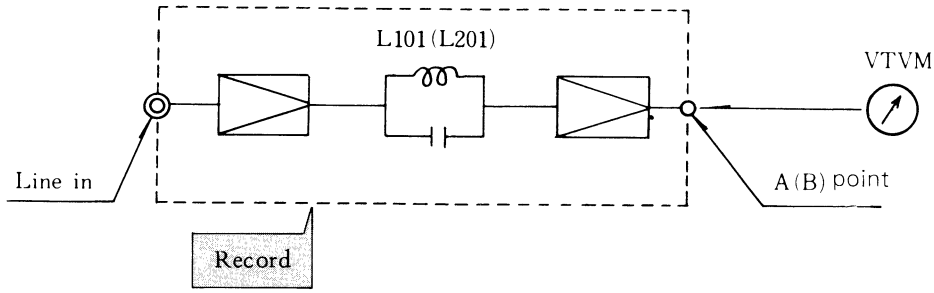
Item	Deck condition	Test tape	Test point	Adjustment	Adjust for	Remark
Hi-speed	Play	MTT-111	A.B. point	Deck A: R636 Deck B: R691	6KHz±60Hz	Earth the base of TR626
Normal-speed	Play	MTT-111	A.B. point	Deck A: R638 Deck B: R693	3KHz±30Hz	After you adjust Hi-speed, adjust normal-speed.

3. PLAYBACK LEVEL ADJUSTMENT



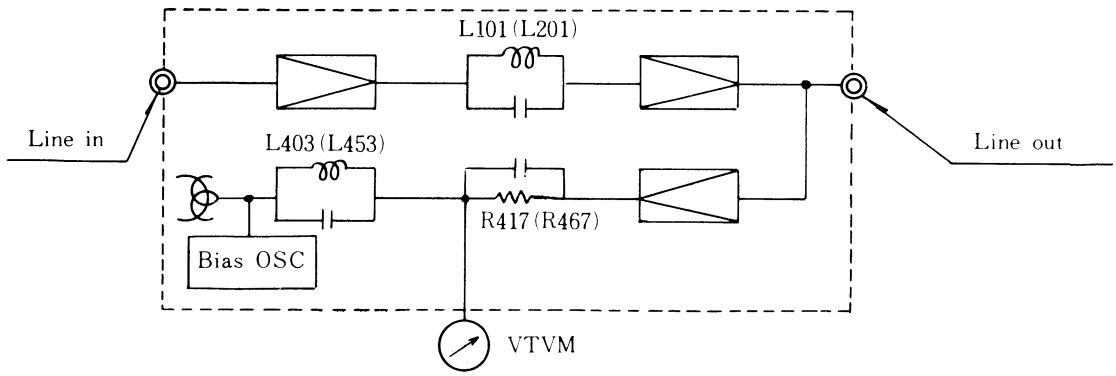
Deck condition	Test tape	Test point	Adjust for	output	Remark
Play	MTT-150	A,B point	Deck A: L-R128, R-228 Deck B: L-R109, R-209	50mV	After you adjust to being associated with Deck A and B, repeat the adjustment several times.

4. BIAS TRAP ADJUSTMENT ①



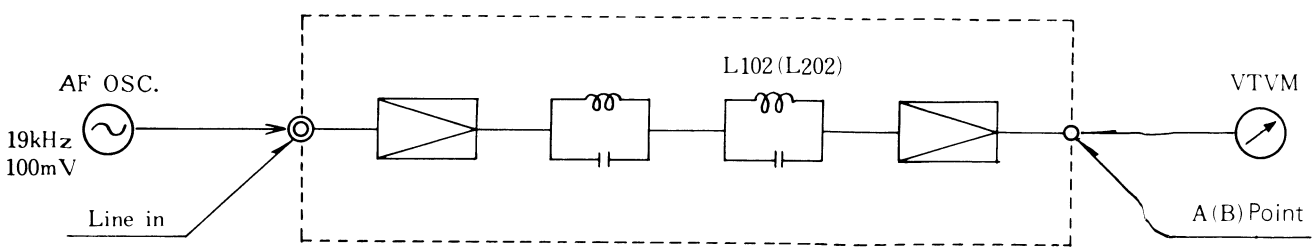
Deck	Deck condition	Test tape	Test point	Adjustment	Adjust for	Remark
Deck A	Stop					Metal function
Deck B	R/P-pause	Blank tape	A,B point	L101, L201	Minimum	

5. BIAS TRAP ADJUSTMENT ②



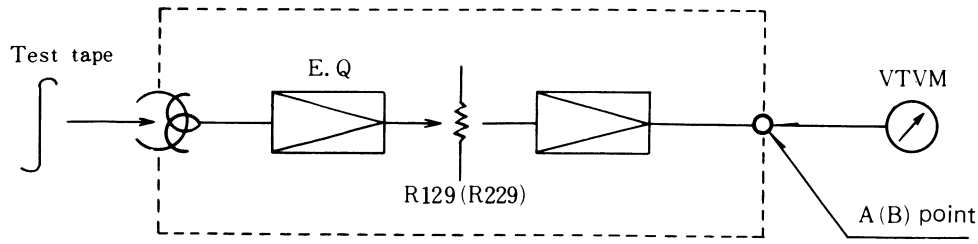
Deck	Deck condition	Test tape	Test point	Adjustment	Adjust for	Remark
Deck A	Stop					Metal Function
Deck B	R/P-pause	Blank tape	R417, R467	L403, L453	Minimum	

6. PILOT SIGNAL TRAP ADJUSTMENT



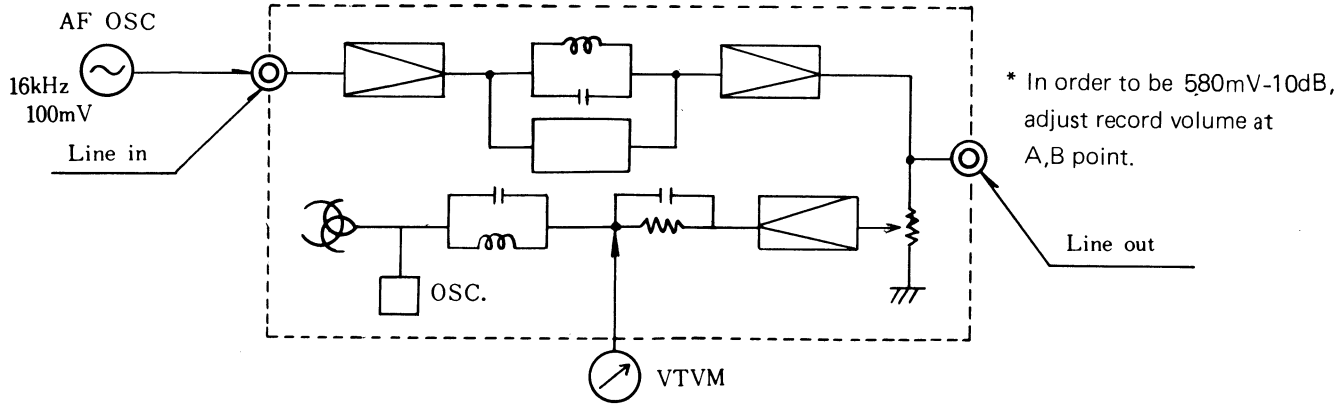
Deck	Deck condition	Test tape	Test point	Adjustment	Input	Adjust for	Remark
Deck A	Stop				19KHz 100mV	Minimum	Dubbing off
Deck B	R/P-pause	Blank tape	A.B point	L102, L202			

7. DUBBING LEVEL ADJUSTMENT



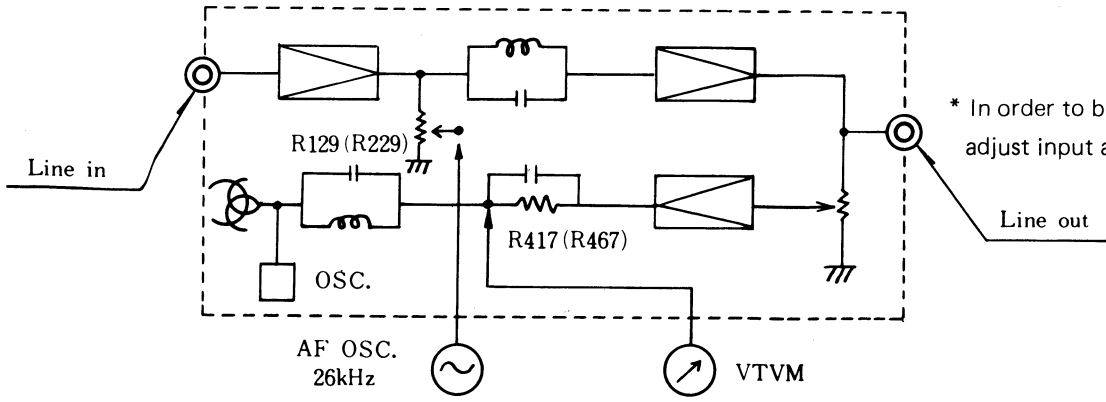
Deck	Deck condition	Test tape	Test point	Adjustment	Output	Adjust for	Remark
Deck A	Play	MTT-150	A, B	R129	580mV	±1 dB	Dubbing condition
Deck B	R/P-pause	Blank tape		R229			

8. REC PEAKING FREQUENCY-AT NORMAL SPEED



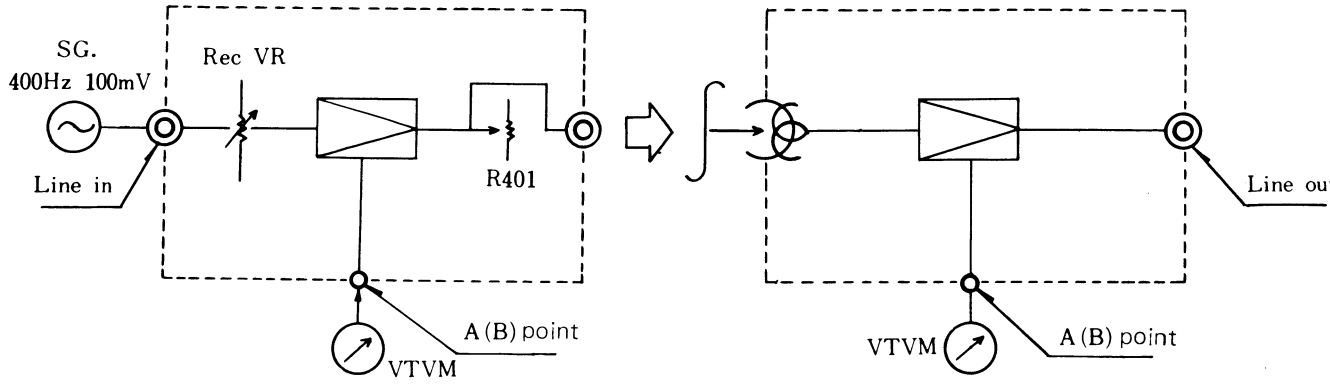
Deck	Deck condition	Test tape	Test point	Adjustment	Input	Adjust for	Remark
Deck A	Stop				16 KHz	Maximum	Dubbing off, Hi-speed off
Deck B	R/P-pause	Blank tape	R417, R467	L401, L451	100mV		

9. REC. PEAKING FREQUENCY-AT HI-SPEED



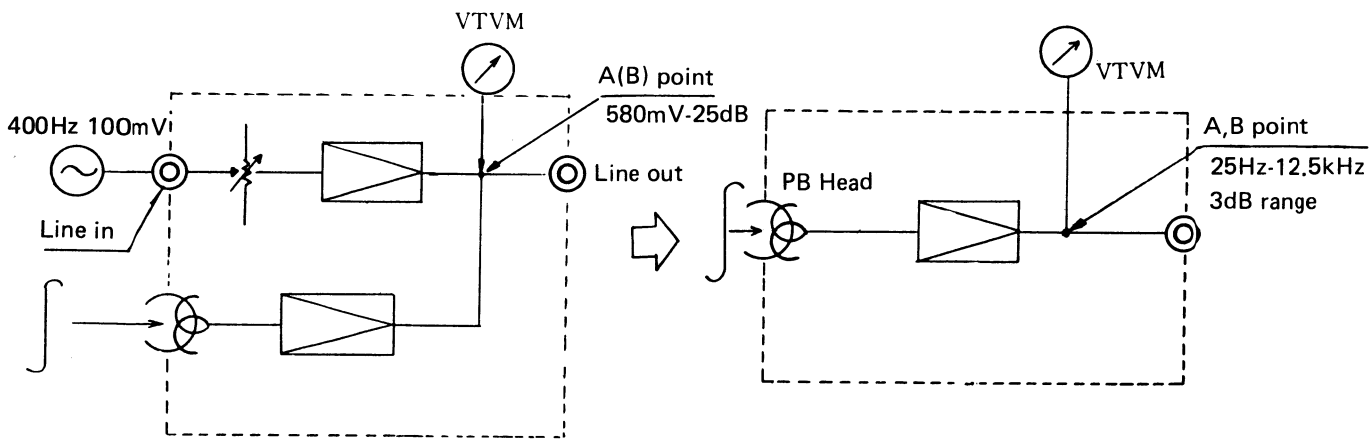
Deck	Deck condition	Test tape	Test point	Adjustment	Input	Adjust for	Remark
Deck A	PB-pause	Blank tape	R407 R417	L402 L452	26KHz, 100mV-10dB. Give the center tap of R129, 229 the input.	Maximum	Dubbing Hi-speed on
Deck B	R/P-pause	Blank tape					

10. REC. LEVEL ADJUSTMENT



Deck	Deck condition	Test tape	Test point	Adjustment	Input	Output	Point	Remark
Deck A	Stop			R401	Rec. VR.–Max. A,B point– 400Hz, 580mV output.	580mV At PB	±1 dB	Normal speed
Deck B	R/P-PB	MTT-501	A.B point	R451				

11. RECORD PLAY FREQUENCY RESPONSE (BIAS ADJUSTMENT)



Deck	Deck condition	Test tape	Test point	Adjustment	Input	Remark
Deck A	Stop				250Hz-12.5KHz 400Hz. Output: 580mV-25dB	Normal speed
Deck B	R/P-PB	MTT-501 CS-26, Metalic-4	A,B point	R301 R302		

NOTE: Adjust under normal speed, confirm R/P response of Hi-speed, repeat steps 10 and 11 several times at the same time.

STANDARD MAINTENANCE

TAPE Head and Capstan Cleaning

Whenever a unit is brought in for service or repair, clean the tape heads, capstan drive shaft and other tape handling surfaces to ensure proper tape handling and optimum frequency response. Use a cotton swab dipped in head cleaner or denatured alcohol to clean all tape handling surfaces. Wipe dry.

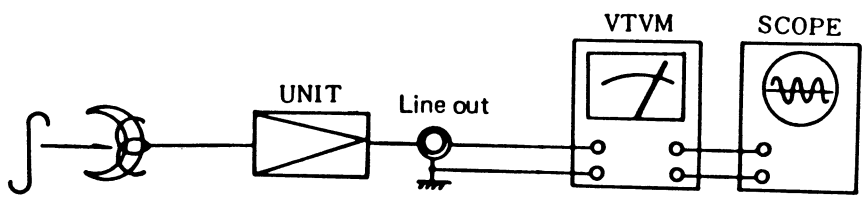
Tape Head Demagnetization

Do not use magnetized tools near the tape heads, since they can magnetize the head. After long period of the heads will retain a small amount of residual magnetism. A magnetized head will result in loss of high frequency response and increase noise. Use a standard tape head demagnetizer and follow the instructions supplied with it to demagnetize the heads.

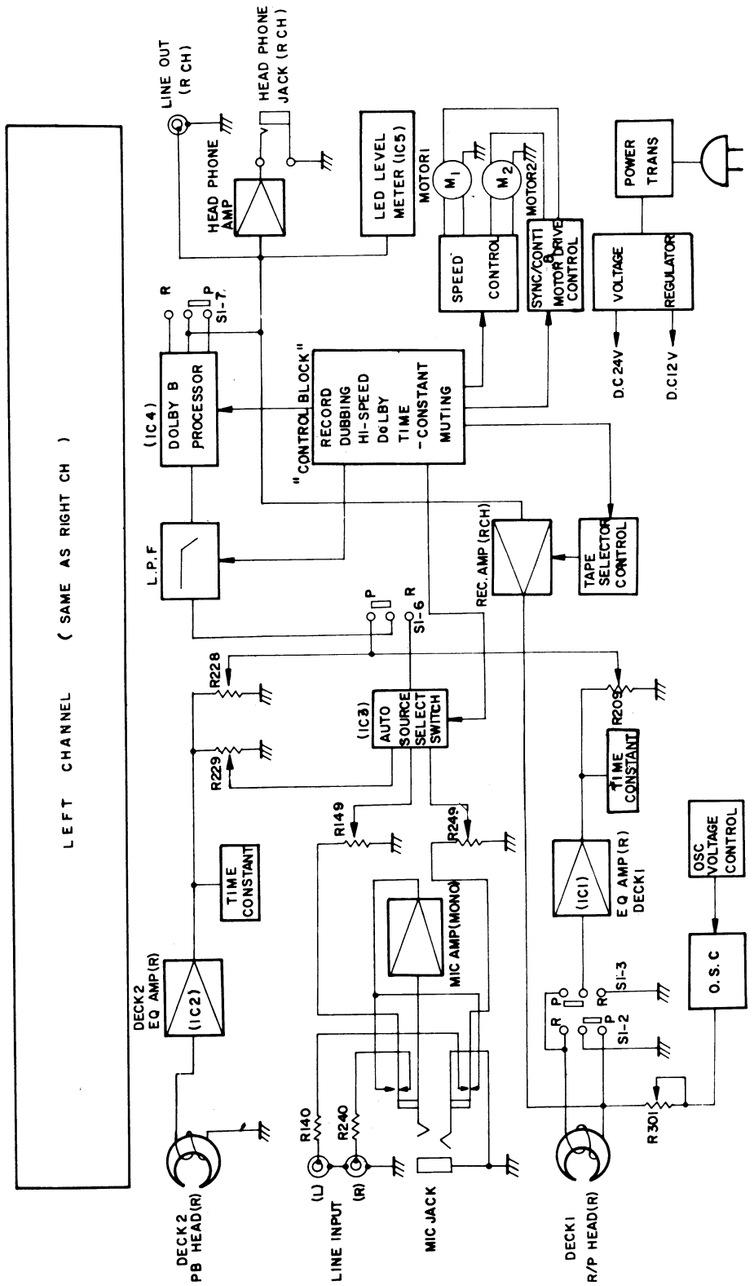
Azimuth Adjustment

1. Azimuth adjustment is normally required when the head is replaced, or for cases of cross-talk and poor high frequency response. A test tape is required for such adjustment.

2. Connect a scope or VTVM to the right channel Sp out. Insert a test tape into the unit (Use a test tape such as TEAC MTT-114, MTT-115). Adjust the azimuth adjustment screw for maximum output onto the right channel. Use glyptal or other non-hardening cement to lock the azimuth adjustment screw.



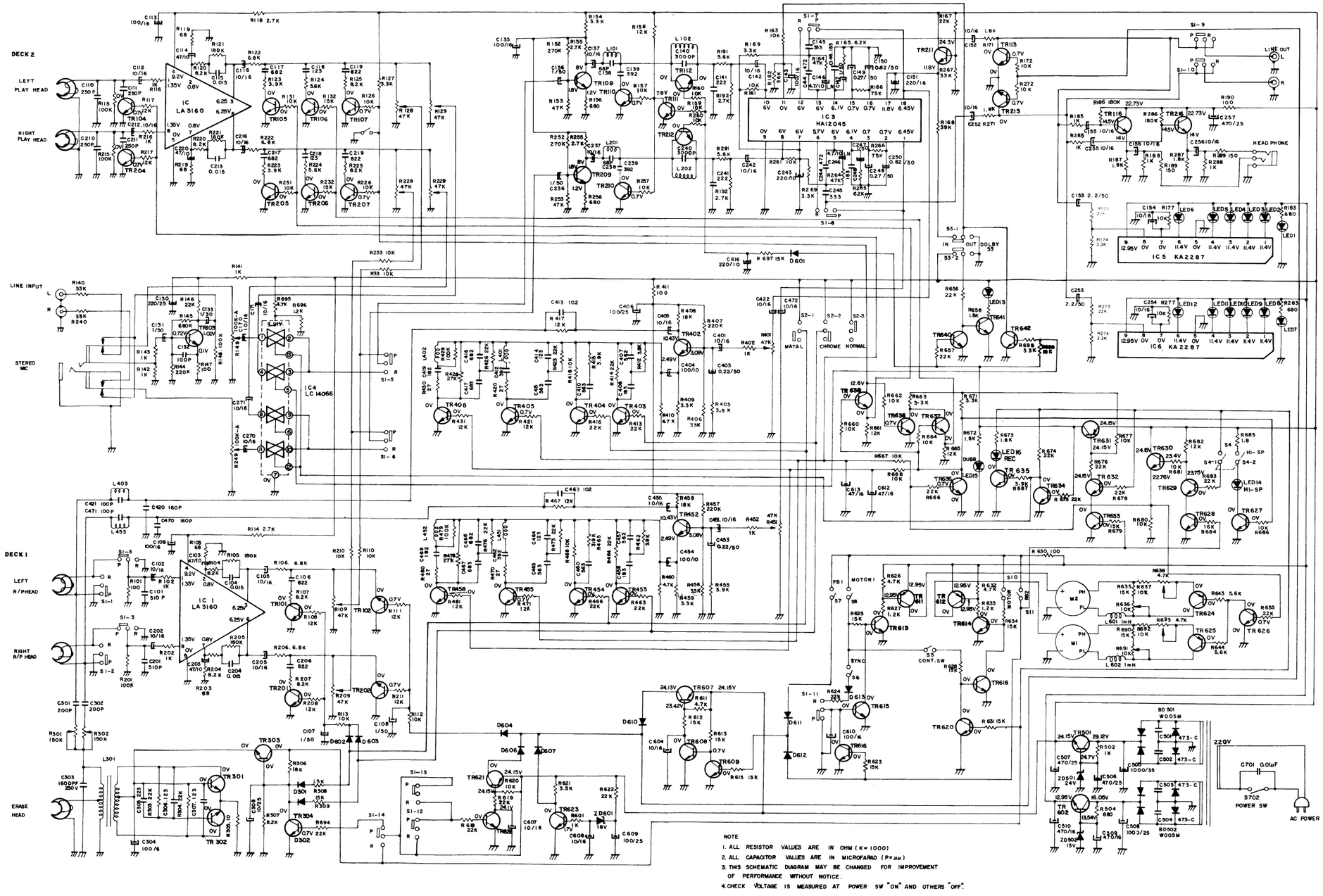
BLOCK DIAGRAM



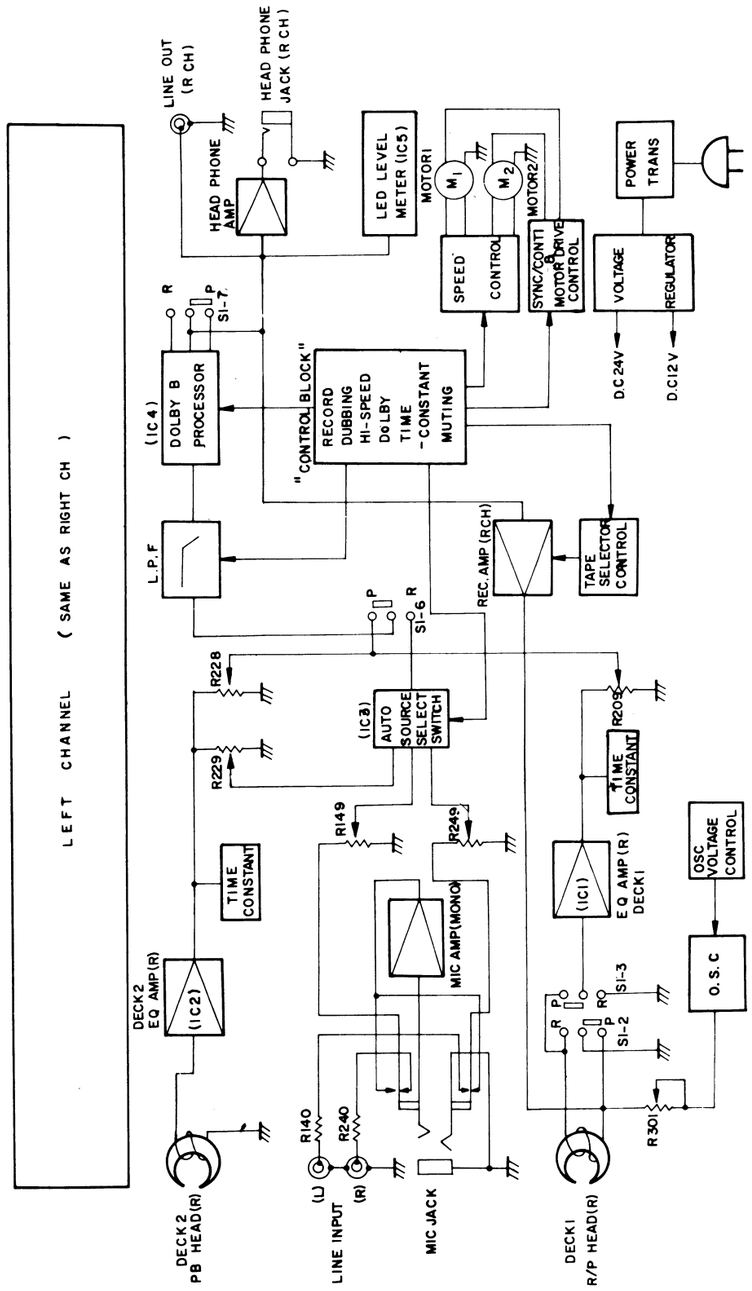
NOTES

SCHEMATIC DIAGRAM

- **GSW-5220**



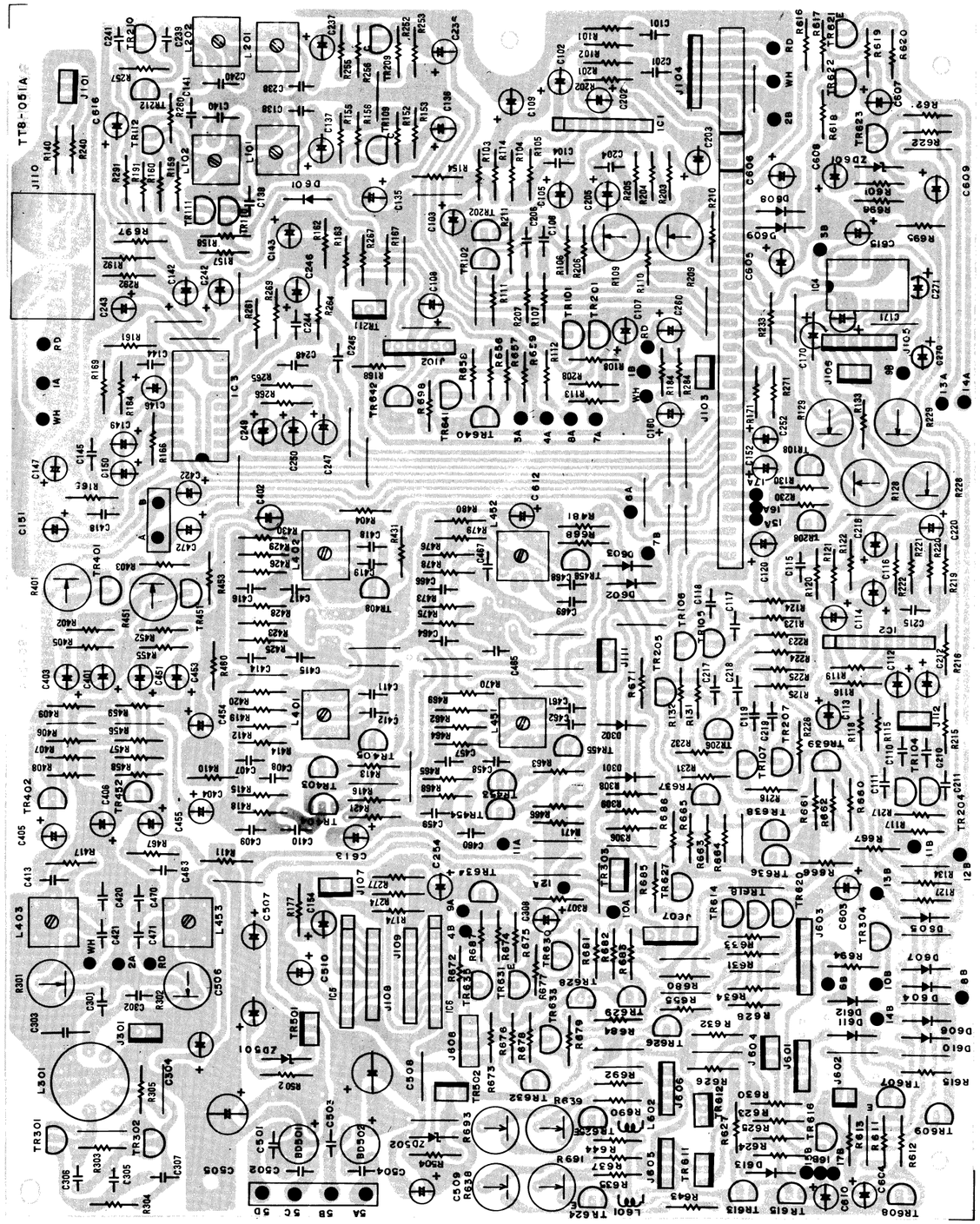
BLOCK DIAGRAM



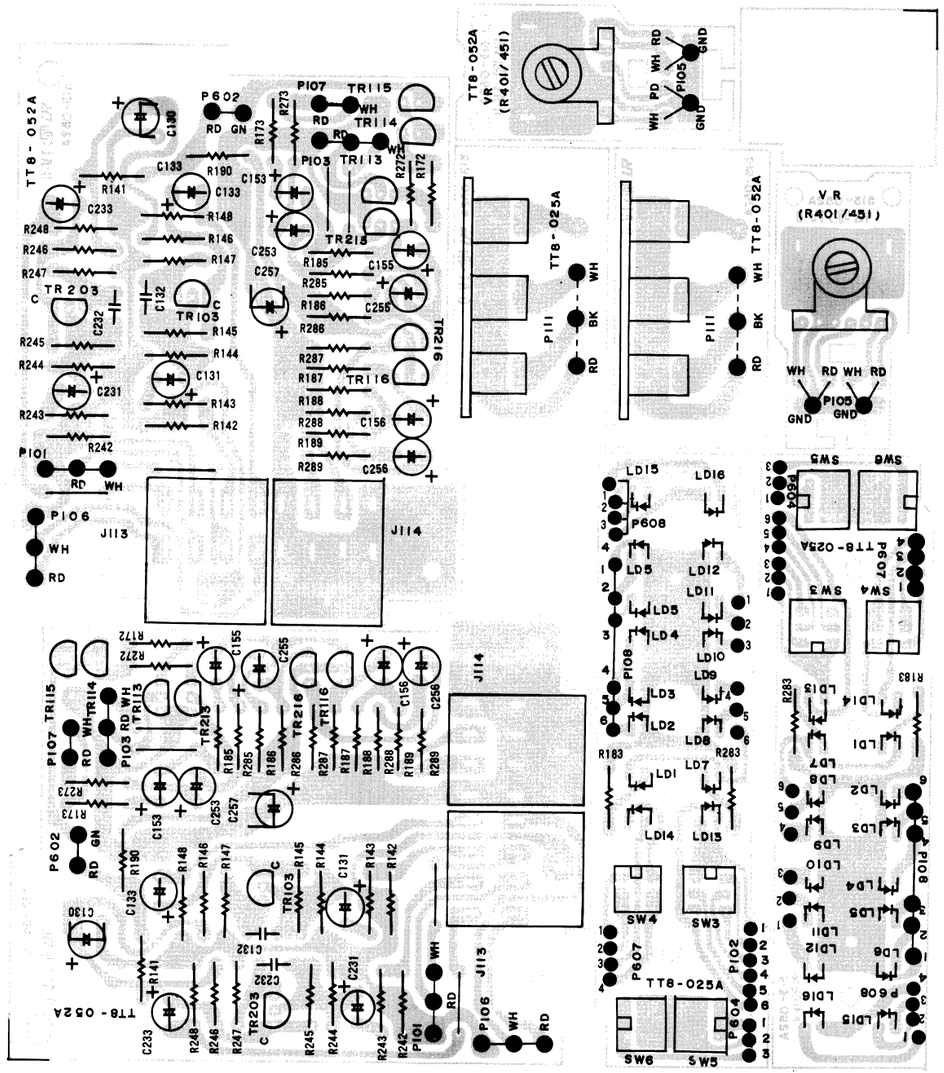
NOTES

PCB LAYOUT

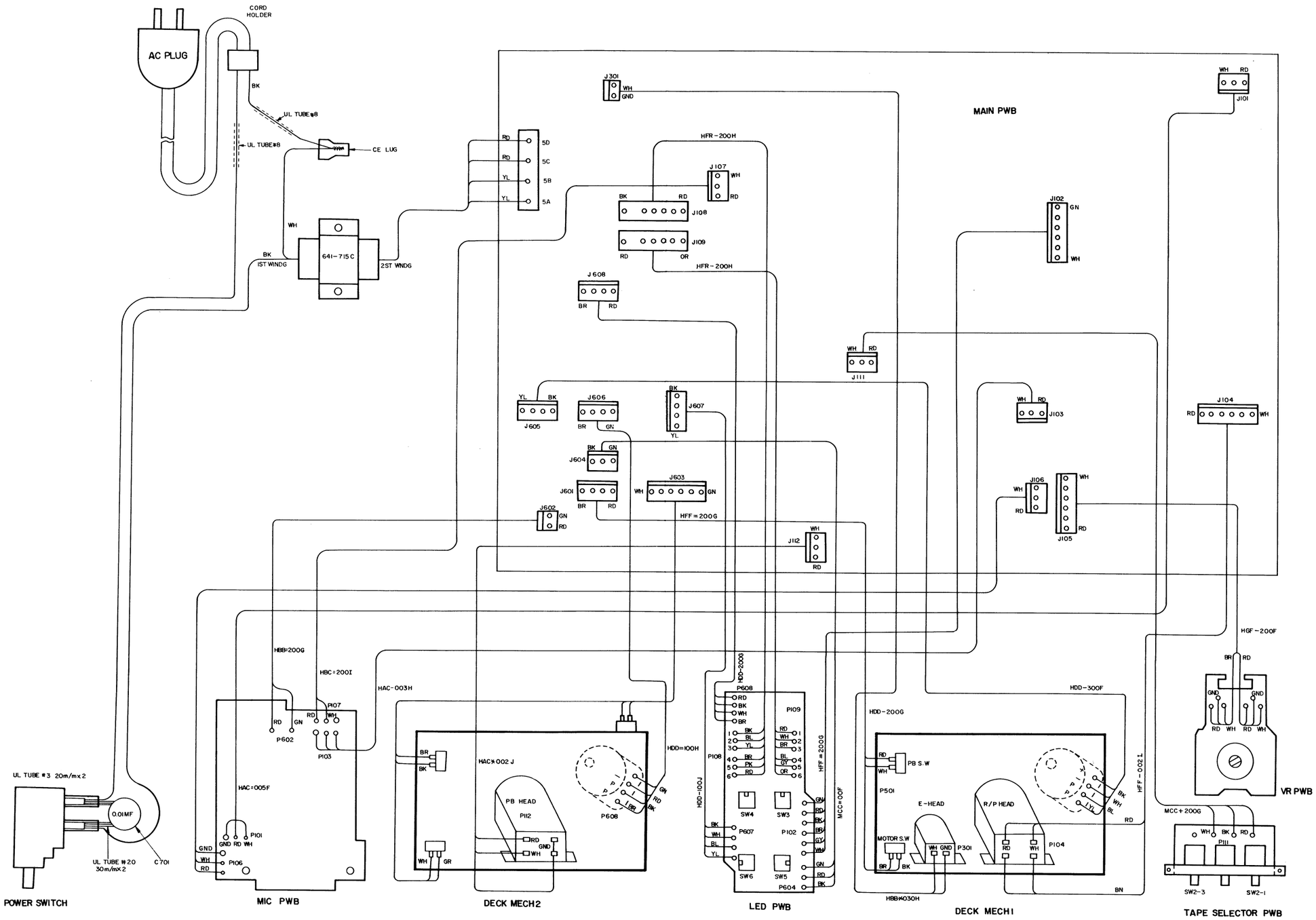
- MAIN P.C. BOARD



MIC & HEADPHONE P.C.BOARD

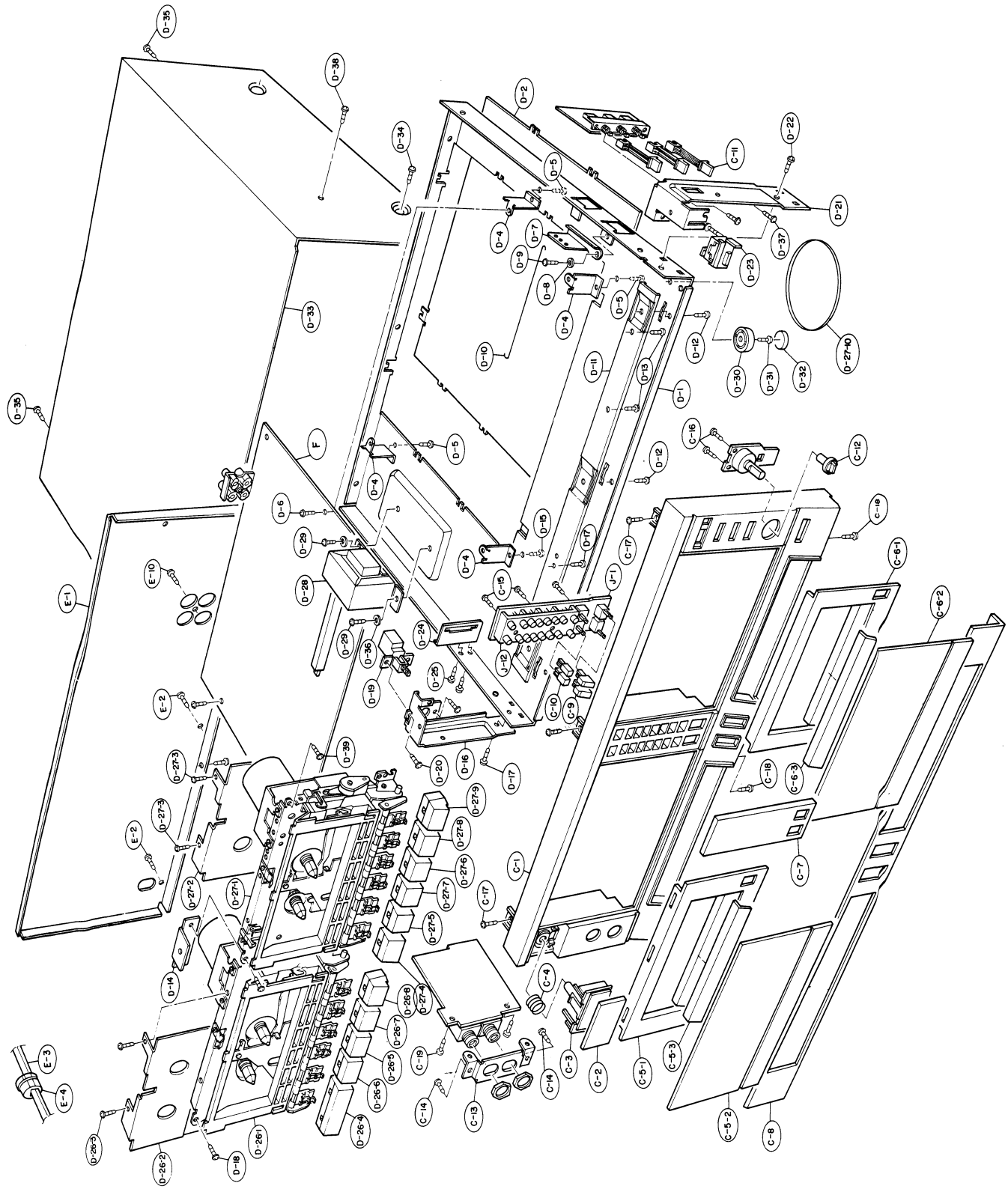


WIRING DIAGRAM



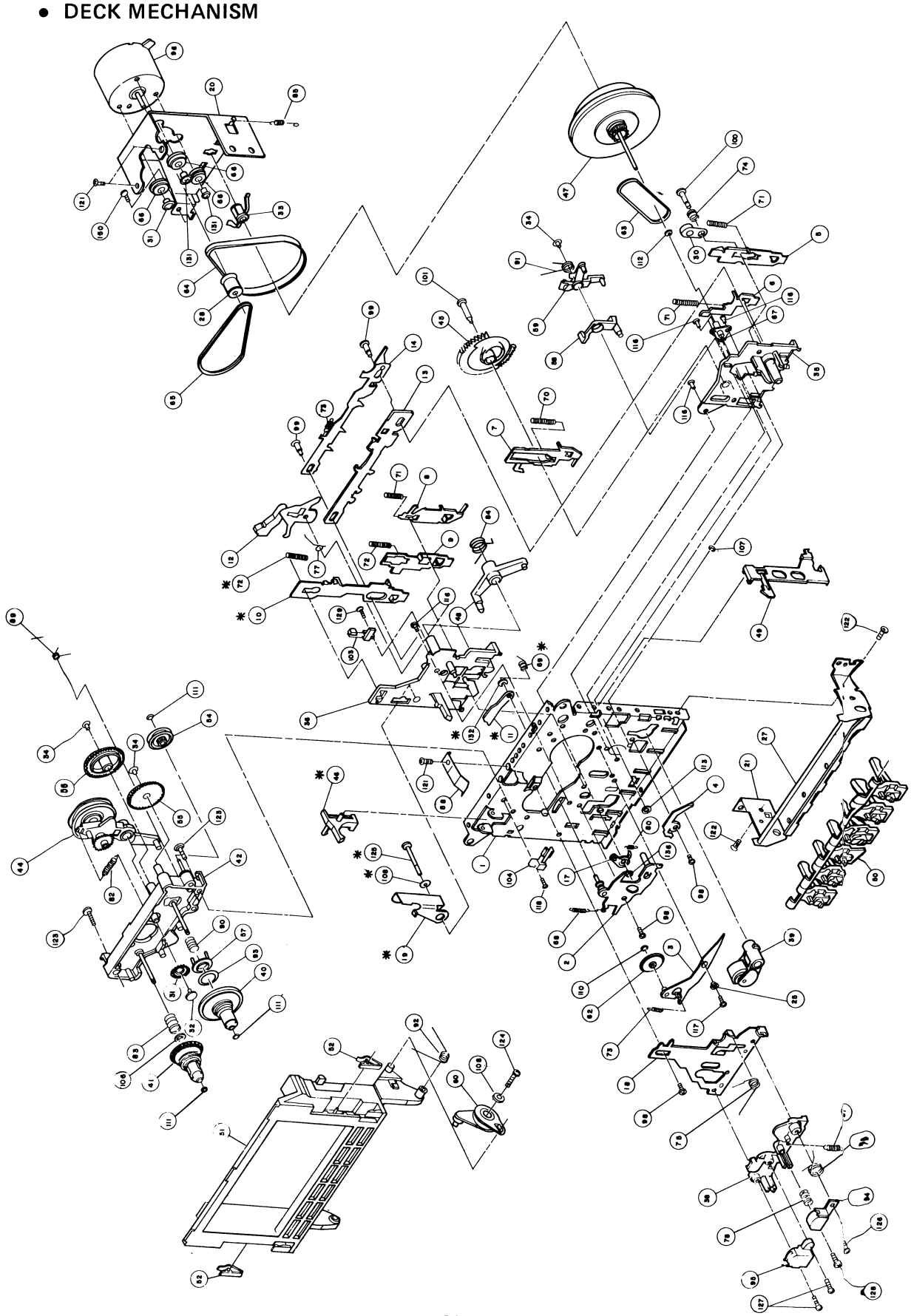
EXPLODED VIEW

- **CABINET**



EXPLODED VIEW

- DECK MECHANISM



REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTICE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the safety precaution of this service manual, don't degrade the safety of the receiver through improper servicing.

• ELECTRICAL

Location No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	668-145A	IC, LA3160 (Pre-Amp)
IC2	668-145A	IC, LA3160 (Pre-Amp)
IC3	668-664A	IC, HA12045 (Dolby)
IC4	668-662A	IC, KIA7658P (EQ)
IC5	668-660D	IC, KA2287 LED OR
IC6	668-660D	IC, KA2287 LED OR
TRANSISTORS		
TR101	665-812B	TR, KTC1815-Y
TR102	665-812B	TR, KTC1815-Y
TR103	662-606C	TR, MPS9635C
TR104-108	665-812B	TR, KTC1815-Y
TR109	662-606C	TR, MPS9635C
TR110-116	665-812B	TR, KTC1815-Y
TR201-202	665-812B	TR, KTC1815-Y
TR204-208	665-812B	TR, KTC1815-Y
TR209	662-606C	TR, MPS9635C
TR210	665-812B	TR, KTC1815-Y
TR211	665-708B	TR, KTD526-Y
TR212-213	665-812B	TR, KTC1815-Y
TR216	665-812B	TR, KTC1815-Y
TR301-302	665-881C	TR, KTC2236A-Y
TR303	665-708B	TR, KTD526-Y
TR304	665-812B	TR, KTC1815-Y
TR401	665-812B	TR, KTC1815-Y
TR402	665-816B	TR, KTC732TM-BL
TR403-405	665-812B	TR, KTC1815-Y
TR408	665-812B	TR, KTC1815-Y
TR451	665-812B	TR, KTC1815-Y
TR452	665-816B	TR, KTC732TM-BL
TR453-455	665-812B	TR, KTC1815-Y
TR458	665-812B	TR, KTC1815-Y
TR501-502	665-708B	TR, KTD526-Y
TR607	665-813B	TR, KTA1015-Y
TR608-609	665-812B	TR, KTC1815-Y
TR611-612	665-712B	TR, KTA966A-Y
TR613-616	665-812B	TR, KTC1815-Y
TR618	665-812B	TR, KTC1815-Y
TR620	665-812B	TR, KTC1815-Y
TR621	665-813B	TR, KTA1015-Y
TR622-623	665-812B	TR, KTC1815-Y
TR624-625	665-813B	TR, KTA1015-Y
TR626-630	665-812B	TR, KTC1815-Y
TR631	665-813B	TR, KTA1015-Y
TR632-642	665-812B	TR, KTC1815-Y
DIODES		
D301-302	652-605B	Switch,1S2472
D601-613	652-605B	Switch,1S2472
BD501-502	652-013A	Rect,W005M
ZD501	654-607E	Zener, ZPD-24
ZD502	654-607B	Zener, ZPD-13
ZD601	654-607D	Zener, ZPD-18
LA1-4	653-636D	LED, SLR54GC3-H
LD5, 6	653-636A	LED, SLR54URC3 RD
LD7-10	653-636D	LED, SLR54GC3-H
LD11-16	653-636A	LED, SLR54URC3-G RD
COILS		
L101-102	638-601C	Coil, Trap
L201-202	638-601C	Coil, Trap

Location No.	Part No.	Description
L301	634-608C	Coil, Bias Osc Round Type 1.7mH
L401-403	638-601C	Coil, Trap
L451-453	638-601C	Coil, Trap
L601-602	639-003G	Coil, Padding 1mH
VARIABLE RESISTORS		
R109	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R209	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R128	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R129	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R149	611-640A	VR, K162T00-100KAx2 (L=25)
R228	613-002G	VR, Semi-Fixed SR19R-47KB 10D
R229	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R249	611-640A	VR, K162T00-100KAx2 (L=25)
R301	613-002E	VR, Semi-Fixed SR19R-150KB, 10D
R302	513-002E	VR, Semi-Fixed SR19R-150KB, 10D
R401	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R451	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R636	613-002F	VR, Semi-Fixed SR19R-10KB, 10D
R638	613-002C	VR, Semi-Fixed SR19R-4.7KB, 10D
R691	613-002F	VR, Semi-Fixed SR19R-10KB, 10D
R693	613-002C	VR, Semi-Fixed SR19R-4.7KB, 10D
MISCELLANEOUS		
S1	552-608A	SW, Slide CL114K Shorting
SW2	554-636A	SW, Push SUY31A Inter-Lock
S3-6	554-635A	SW, Push SPH121A Self-Lock
	572-059A	Jack, MIC
	572-059B	Jack Headphone
	576-002A	Jack, Block 5-437P

• CABINET

Location No.	Part No.	Description
C-1	258-010D	Panel, Front
C-2-1	273-800A	Knob, Power
C-2-2	324-331A	Holder, Power-Knob
C-4	442-634U	Spring, Knob (For Power Knob)
C-5	236-193A	Window Ass'y, CST-Door (Left)
C-5-1	324-300A	Holder, CST-Window
C-5-2	236-025A	Window CST-Door-L(A)
C-5-3	246-330B	Decoration, DST-Door-L(A)
C-6	236-193B	Window Ass'y CST-Door (Right)
C-6-1	324-300A	Holder, CST-Window
C-6-2	236-025B	Window, CST-Door-R(B)
C-6-3	246-330C	Deco, CST-Door-R(B)
C-7	236-026D	Window, Led
C-8	251-300M	Plate, AL-Decoration
C-9	273-803A	Knob, Syncronous
C-10	273-804A	Knob, Dolby
C-11	273-805A	Knob, Tape-Select
C-12	273-513D	Knob Rotary
C-13	321-900A	Bracket, Jack
C-14	353-025F	Screw, Special (For Jack-Bracket +Front Pannel)
C-15	TRQ1846J	Screw, TRQ2+3x20A (For LED PCB+ Front Pannel)
C-16	353-025F	Screw Special (For Rec-Level PCB)
C-17	TCQ1830J	Screw, Tapping

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TR109	662-606C	TR, MPS9635C
TR110-116	665-812B	TR, KTC1815-Y
TR201-202	665-812B	TR, KTC1815-Y
TR204-208	665-812B	TR, KTC1815-Y
TR209	662-606C	TR, MPS9635C
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TR212-213	665-812B	TR, KTC1815-Y
TR216	665-812B	TR, KTC1815-Y
TR301-302	665-881C	TR, KTC2236A-Y
TR303	665-708B	TR, KTD526-Y
TR304	665-812B	TR, KTC1815-Y
TR401	665-812B	TR, KTC1815-Y
TR402	665-816B	TR, KTC732TM-BL
TR403-405	665-812B	TR, KTC1815-Y
TR408	665-812B	TR, KTC1815-Y
TR451	665-812B	TR, KTC1815-Y
TR452	665-816B	TR, KTC732TM-BL
TR453-455	665-812B	TR, KTC1815-Y
TR458	665-812B	TR, KTC1815-Y
TR501-502	665-708B	TR, KTD526-Y
TR607	665-813B	TR, KTA1015-Y
TR608-609	665-812B	TR, KTC1815-Y
TR611-612	665-712B	TR, KTA966A-Y
TR613-616	665-812B	TR, KTC1815-Y
TR618	665-812B	TR, KTC1815-Y
TR620	665-812B	TR, KTC1815-Y
TR621	665-813B	TR, KTA1015-Y
TR622-623	665-812B	TR, KTC1815-Y
TR624-625	665-813B	TR, KTA1015-Y
TR626-630	665-812B	TR, KTC1815-Y
TR631	665-813B	TR, KTA1015-Y
TR632-642	665-812B	TR, KTC1815-Y
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D601-613	652-605B	Switch,1S2472
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ZD501	654-607E	Zener, ZPD-24
ZD502	654-607B	Zener, ZPD-13
ZD601	654-607D	Zener, ZPD-18
LA1-4	653-636D	LED, SLR54GC3-H
LD5, 6	653-636A	LED, SLR54URC3 RD
LD7-10	653-636D	LED, SLR54GC3-H
LD11-16	653-636A	LED, SLR54URC3-G RD
COILS		
L101-102	638-601C	Coil, Trap
L201-202	638-601C	Coil, Trap

Location No.	Part No.	Description
L301	634-608C	Coil, Bias Osc Round Type 1.7mH
L401-403	638-601C	Coil, Trap
L451-453	638-601C	Coil, Trap
L601-602	639-003G	Coil, Padding 1mH
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R129	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R149	611-640A	VR, K162T00-100KAx2 (L=25)
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R229	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R249	611-640A	VR, K162T00-100KAx2 (L=25)
R301	613-002E	VR, Semi-Fixed SR19R-150KB, 10D
R302	513-002E	VR, Semi-Fixed SR19R-150KB, 10D
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R451	613-002G	VR, Semi-Fixed SR19R-47KB, 10D
R636	613-002F	VR, Semi-Fixed SR19R-10KB, 10D
R638	613-002C	VR, Semi-Fixed SR19R-4.7KB, 10D
R691	613-002F	VR, Semi-Fixed SR19R-10KB, 10D
R693	613-002C	VR, Semi-Fixed SR19R-4.7KB, 10D
MISCELLANEOUS		
S1	552-608A	SW, Slide CL114K Shorting
SW2	554-636A	SW, Push SUY31A Inter-Lock
S3-6	554-635A	SW, Push SPH121A Self-Lock
	572-059A	Jack, MIC
	572-059B	Jack Headphone
	576-002A	Jack, Block 5-437P

• CABINET

Location No.	Part No.	Description
C-1	258-010D	Panel, Front
C-2-1	273-800A	Knob, Power
C-2-2	324-331A	Holder, Power-Knob
C-4	442-634U	Spring, Knob (For Power Knob)
C-5	236-193A	Window Ass'y, CST-Door (Left)
C-5-1	324-300A	Holder, CST-Window
C-5-2	236-025A	Window CST-Door-L(A)
C-5-3	246-330B	Decoration, DST-Door-L(A)
C-6	236-193B	Window Ass'y CST-Door (Right)
C-6-1	324-300A	Holder, CST-Window
C-6-2	236-025B	Window, CST-Door-R(B)
C-6-3	246-330C	Deco, CST-Door-R(B)
C-7	236-026D	Window, Led
C-8	251-300M	Plate, AL-Decoration
C-9	273-803A	Knob, Syncronous
C-10	273-804A	Knob, Dolby
C-11	273-805A	Knob, Tape-Select
C-12	273-513D	Knob Rotary
C-13	321-900A	Bracket, Jack
C-14	353-025F	Screw, Special (For Jack-Bracket +Front Pannel)
C-15	TRQ1846J	Screw, TRQ2+3x10A (For LED PCB+ Front Pannel)
C-16	353-025F	Screw Special (For Rec-Level PCB)
C-17	TCQ1830J	Screw, Tapping

Location No.	Part No.	Description	Location No.	Part No.	Description
C-17	TCQ1830J	Screw, Tapping TC3+3x6 (For Front Pannel Fix, Up)	D-26-5	273-801C	Knob, CST Function (RWD)
C-18	TCQ1836J	Screw, TCQ+3x8 (For Front Pannel Fix, Down)	D-26-6	273-801D	Knob, CST-Function (Stop/Eject)
C-19	TRQ1830J	Screw, TRQ2+3x6A (For Jack Bracket+ PCB)	D-26-7	273-801E	Knob, CST-Function (Eject)
D-1	313-502A	Chassis Bottom	D-26-8	273-801F	Knob, CST-Function (Pause)
D-2	256-220A	Plate, Bottom	D-26-13	558-028A	S/W, Auto-Tape Selector (For CrO_2)
D-3	TRQ1836J	Screw, TRQ2+3x8A	D-26-14	353-022B	Screw, Special
D-4	321-901A	Bracket, PCB	D-27	412-250B	Deck Ass'y-R
D-5	TRQ1836J	Screw, TRQ2+3x8A (For PCB Bracket)	D-27-1	419-004F	Deck Mechanism
D-6	TRQ1836J	Screw, TRQ2+3x8A (For Main PCB+ Bracket)	D-27-2	221-500A	Cover, Cassette Mechanism
D-7	333-300A	Lever, Record	D-27-3	353-022B	Screw (For Cover Deck Mech)
D-8	341-020A	Bushing, Lever	D-27-4	273-801A	Knob, CST-Function (REC)
D-9	TRQ1836J	Screw, TRQ2+3x8A (For Reclever Fix)	D-27-5	273-801B	Knob, CST-Function (Play)
D-10	442-620B	Spring Record	D-27-6	273-801C	Knob, CST-Function (F.F)
D-11	321-421A	Bracket-A, Deck	D-27-2	273-801D	Knob, CST-Function (RWD)
D-12	TCQ1830J	Screw, Tapping TC3+3x6 (For Bottom+ Bracket A)	D-27-8	273-801E	Knob, CST-Function (Stop/Eject)
D-13	353-022B	Screw (For Bracket A-Deck)	D-27-9	273-801F	Knob, CST-Function (Pause)
D-14	321-902A	Bracket-B, Deck	D-27-10	451-145E	Belt, Counter
D-15	TRQ1836J	Screw, TRQ2+3x8A (Bracket B+Deck A/B)	D-28	641-715C⚠	Trans Power
D-16	321-904A	Bracket-L, Deck	D-29	TRQ02236J	Screw, Tapping TRQ2+4x8A (For Power Trans)
D-17	TRQ1836J	Screw, TRQ2+3x8A (For Bottom+Bracket-L)	D-30	265-027A	Foot
D-18	TRQ1836J	Screw, TRQ2+3x8A (For Deck+Bracket-L)	D-32	472-610B	Felt
D-19	554-612B	SW Power SDLIP	D-33	213-252A	Cabinet
D-20	MRC1830J	Screw (For Power SW)	D-34	353-633A	Screw, Special (For Cabinet, Side)
D-21	321-903A	Bracket-R, Deck	D-35	TRQ1836I	Screw, TRQ2+3x8A (For Cabinet-Rear)
D-22	TRQ1836J	Screw, TRQ2+3x8A (For Bottom+Bracket-R)	D-37	MRC1830J	Screw
D-23	517-117A	Tape Counter	D-38	353-025B	Screw Special (For Cabinet Side)
D-24	324-334A	Holder, Jack-PCB	D-39	TCQ1836J	Screw, TRQ2+3x8A (For Deck+Bracket-R)
D-25	TRQ1836J	Screw TRQ2+3x8A (For Bottom+Holder-Jack, PCB)	D-40	562-024B	CE LUG, Nylon
D-26	412-250A	Deck Ass'y-L	E-1	313-500C	Chassis, Back
D-26-1	419-004B	Deck Mechanism	E-2	TRQ1836I	Screw, TRQ2+3x8A (For Back Chassis+ Bottom Chassis)
D-26-2	221-500A	Cover, CST-Mechanism			
D-26-3	353-022B	Screw (For Cover Deck Mech)	E-3	681-004F⚠	Power Cord
D-26-4	273-802A	Knob, CST-Play (F.F)	E-4	324-348A	Holder, Cord

Location No.	Part No.	Description	Location No.	Part No.	Description
E-10	353-025B	Screw Special (For RCA Jack)		511-052A	PCB Ay MIC & Headpone
F	511-051A	PCB Ass'y, Main		564-017E	Cord Phono 700m/m

• DECK MECHANISM

Location No.	Part No.	Description	Location No.	Part No.	Description
1	99X-0950	Chassis	52	99X-0992	Cst Clamp
2	99X-0951	Shift Arm Ass'y	54	99X-0993	Auto Pulley
3	99X-0952	Idler Arm (HT) Ass'y	55	99X-0994	Auto Gear
4	99X-0953	Pause Arm	56	99X-0995	Auto Cam Gear
5	99X-0954	Pause Lever (B) Ass'y	57	99X-0996	Auto Clutch
6	99X-0955	Stop Lever	58	99X-0997	Auto Arm (B)
7	99X-0956	FF Lever (H)	59	99X-0998	Auto Lock Arm
8	99X-0957	Rew Lever (H)	60	99X-0999	Damper Ass'y
9	99X-0958	Play Lever (S) Ass'y	62	99X-1000	Play Idler
*10	99X-0959	Rec Lever (C)	63	99X-1001	Auto Belt
*11	99X-0960	Rec Lever (BH)	64	99X-1062	Drive Belt
12	99X-0961	RC Arm Ass'y	65	99X-1063	FR Belt
13	99X-0962	Lock Cam (C)	66	99X-1004	Motor Cushion
14	99X-0963	Lock Cam (B) Ass'y	67	99X-1005	Housing Ass'y
17	99X-0964	RC Lock Arm (N) Ass'y	68	99X-1006	Shift Arm Spring
18	99X-0965	Head Chassis	*69	99X-1007	Rec Lever Spring (B)
*19	99X-0966	Record Arm	70	99X-1008	FF Lever Spring
20	99X-0967	Motor Holder	71	99X-1009	Rew Lever Spring
21	99X-0968	Button Holder (B)	72	99X-1010	Lever Spring
25	99X-0969	Collar	73	99X-1011	Cam Spring
27	99X-0970	Button Shaft	74	99X-1012	Pause Cam Spring
28	99X-1061	Motor Pulley	75	99X-1013	Head Chassis Spring
30	99X-0972	Pause Cam	77	99X-1014	RC Arm Spring
31	99X-0973	FF Gear	78	99X-1015	Head Spring
32	99X-0974	Bush	79	99X-1016	Roller Spring
33	99X-0975	Capstan Holder	80	99X-1017	RC Lock Arm Spring
34	99X-0976	Bush	81	99X-1018	Head Chassis Rtn Sp
35	99X-0977	Lever Holder (A)	82	99X-1019	Clutch Arm Spring
36	99X-0978	Lever Holder (B)	83	99X-1020	Back Tension Sp
38	99X-0979	Head Base	84	99X-1021	Lock Arm Spring
39	99X-0980	P Rolr Arm Ass'y	85	99X-1022	Eject Lever Spring
40	99X-0981	T Reel Ass'y	88	99X-1023	Pack Spring
41	99X-0982	S-Reel Ass'y	89	99X-1024	Auto Sensor Sp
42	99X-0983	Reel Base Ass'y	90	99X-1025	Auto Clutch Sp
44	99X-0984	Clutch Arm Ass'y	91	99X-1026	Auto Lock Arm Sp
45	99X-0985	Gear-C	92	99X-1027	Cst Case Sp
*46	99X-0986	Rec Sensor	93	99X-1028	Auto Clutch Felt
47	99X-0987	Flywheel Ass'y (1)	94	99X-1029	RP Head
48	99X-0988	Lock Arm (H)	95	99X-1030	E Head
49	99X-0989	Eject Lever (F)	96	99X-1031	Motor
50	99X-0990	Button Lever	99	99X-1032	Screw (A)
51	99X-0991	Cassette Case	98	99X-1033	Screw (B)

Location No.	Part No.	Description	Location No.	Part No.	Description
100	99X-1034	Screw (C)	123	99X-1050	2.6x8 Bind Tap Tite Screw
101	99X-1035	Screw (D)			
103	99X-1036	Leaf Switch	124	99X-1051	2.6x13 Tap Tite Screw
104	99X-1037	Leaf Switch			
106	99X-1038	Reel Washer	*125	99X-1052	2.6x22 Dia Screw
107	99X-1039	Lumiler Washer	126	99X-1053	3x8 Binding Screw
108	99X-1040	Plain Washer	127	99X-1054	2x8.5 Binding Screw
110	99X-1041	Poly Washer	128	99X-1055	2.9 Washer Head Screw
111	99X-1042	Poly Washer			
113	99X-1044	Oil Stop Washer	129	99X-1059	2.6x5 Tapping Screw
116	99X-1045	2x4 Tap Tite Screw			
117	99X-1046	2x5 Tap Tite Screw	130	99X-1057	2.6x6 Tapping Screw
118	99X-1047	2x6 Tap Tite Screw			
121	99X-1048	2.6x4 Tap Tite Screw	131	99X-1058	Motor Screw
122	99X-1049	2.6x5 Tap Tite Screw	*132	99X-1059	D=2.0 E-Ring
		Screw (Flat)	136	99X-1060	Lock Arm Seal

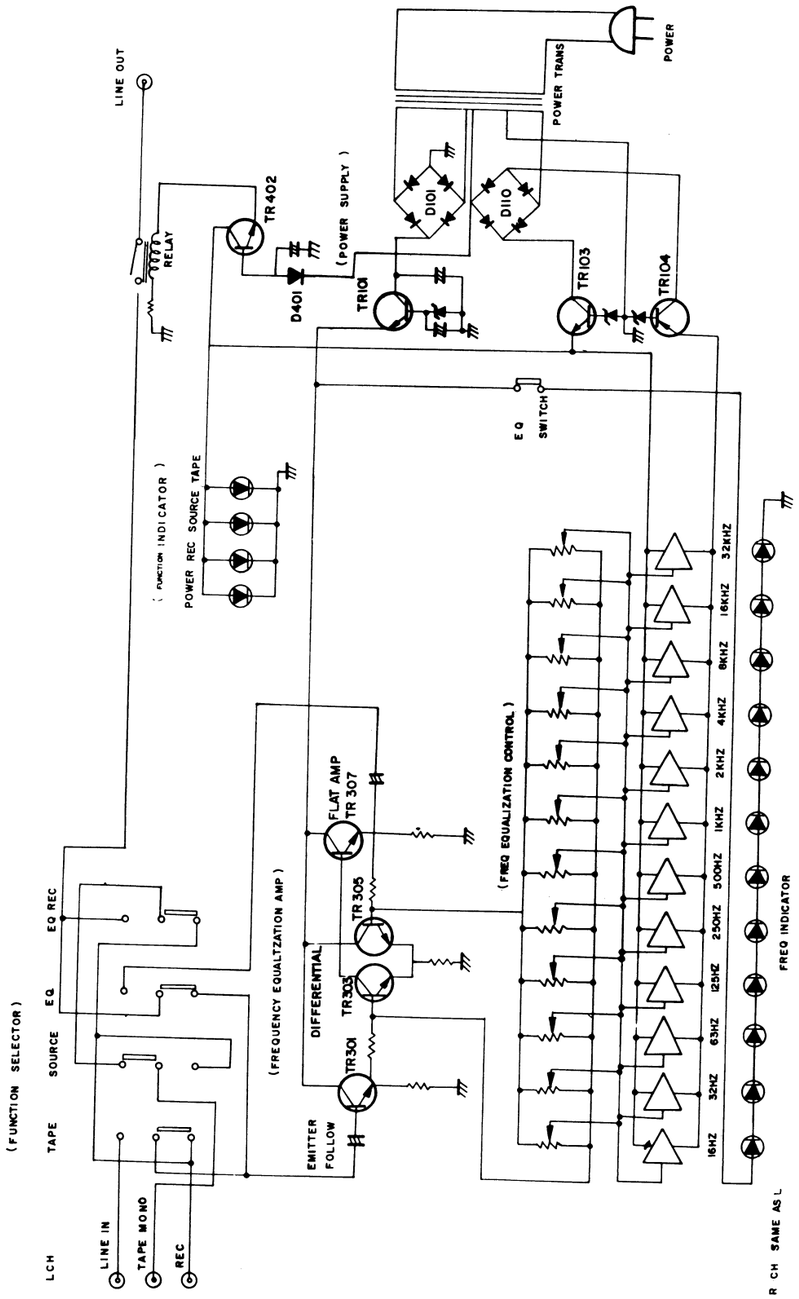
NOTE: Record-play back deckmechanism is consisted of all of the parts and play back deckmechanism is consisted of the others except expressing with "*".

STEREO GRAPHIC EQUALIZER
MODEL: GSQ-5220

SPECIFICATIONS

EQ Variable Range Ratio	±12dB
Center Frequency Error	±10%
Input Capacity	8V/rms
T.H.D. (Input: 1V, Frequency: 20-30KHz)	0.02%
Intermodulation Distortion	0.02%
Frequency Response (–3dB, EQ. VR. Flat)	5 ~ 80000Hz
Power Bandwidth (THD: 0.05%, 1/2 Output Power)	5 ~ 80000Hz
S/N Ratio	90dB
Channel Separation	1KHz: 45dB, 10KHz: 35dB
Cross Talk	1KHz: 70dB, 10KHz: 50dB
Impedance	Input: 47KΩ, Output: 4.7KΩ
In/out Ratio (EQ: on, EQ V.R: Flat Position)	0.5dB
Channel Difference	E.Q. Flat: ±0.5dB (EQ. VR: Flat) E.Q. Max.: ±1 dB (EQ. VR Max)
Semiconductor	121C, 12TR, 6Diode
Power Supply	AC 220V 50Hz
Size	278 x 65 x 345mm
Weight	2.5Kg

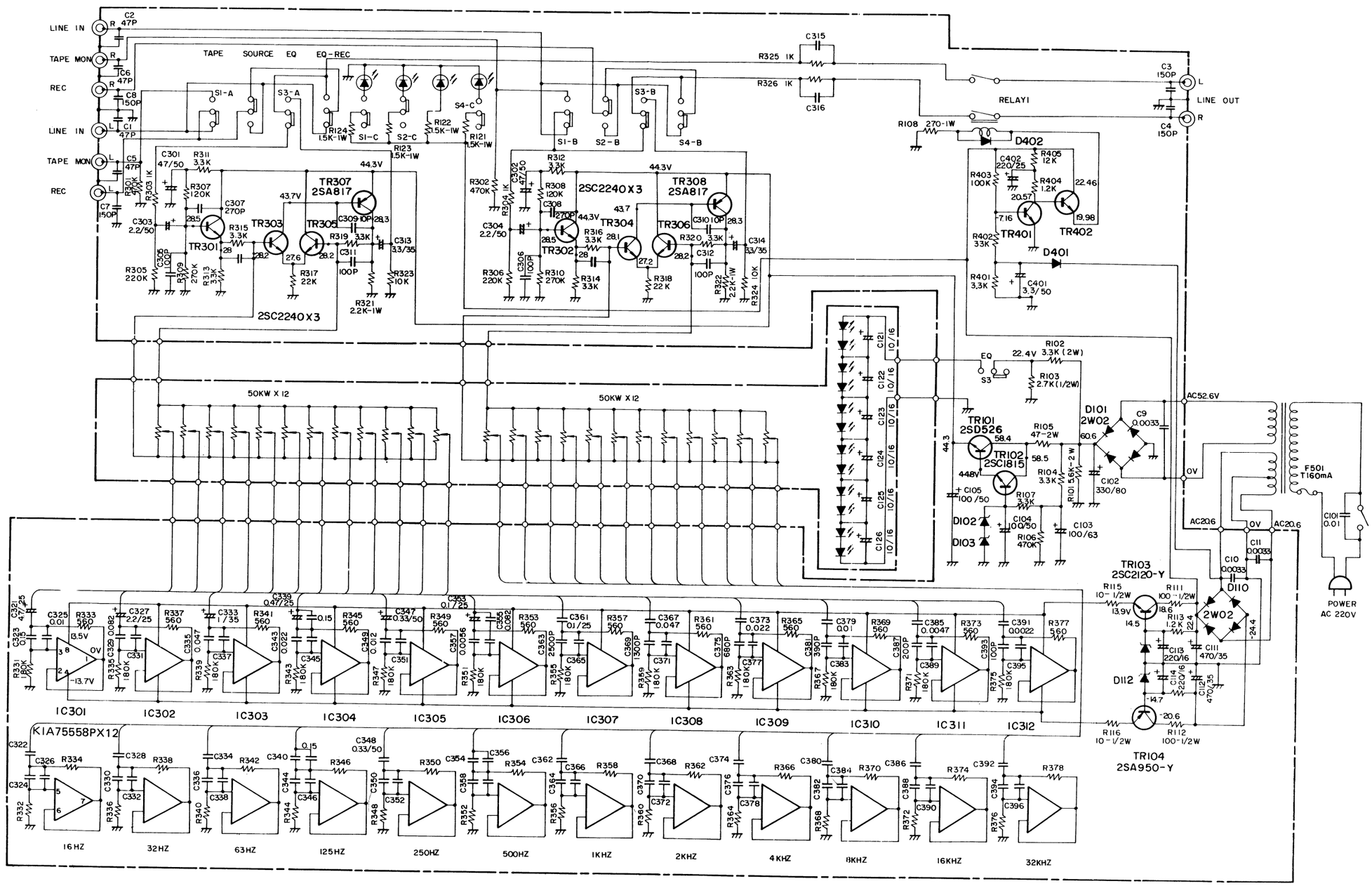
BLOCK DIAGRAM



NOTES

SCHEMATIC DIAGRAM

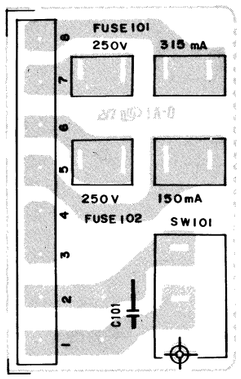
- **GSQ-5220**



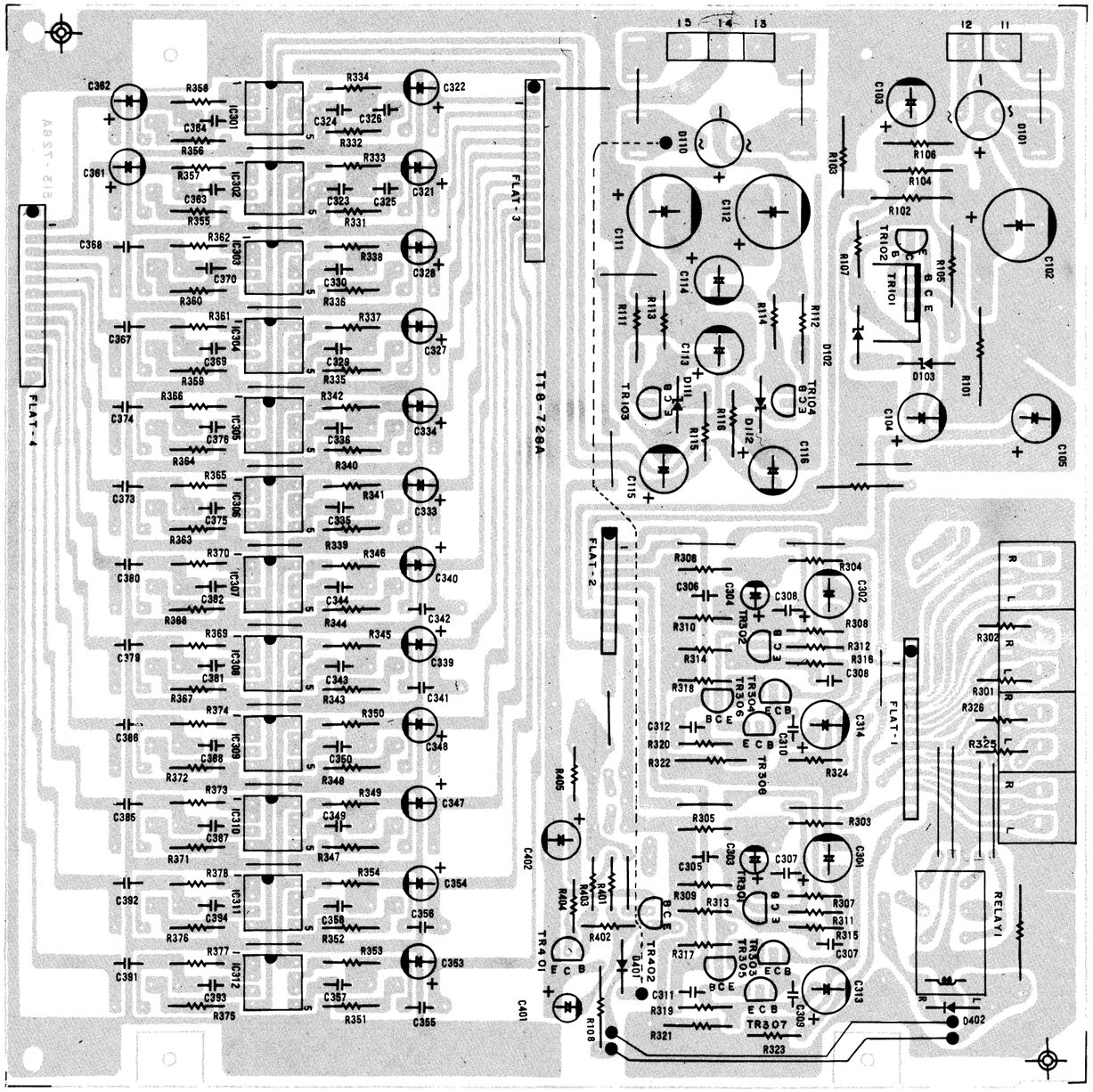
NOTES : 1. ALL RESISTOR VALUES ARE IN OHM.
2. ALL CAPACITOR VALUES ARE IN MICROFARAD.
3. THIS SCHEMATIC DIAGRAM MAY BE CHANGED FOR IMPROVEMENT OF PERFORMANCE WITHOUT NOTICE.

PCB LAYOUT

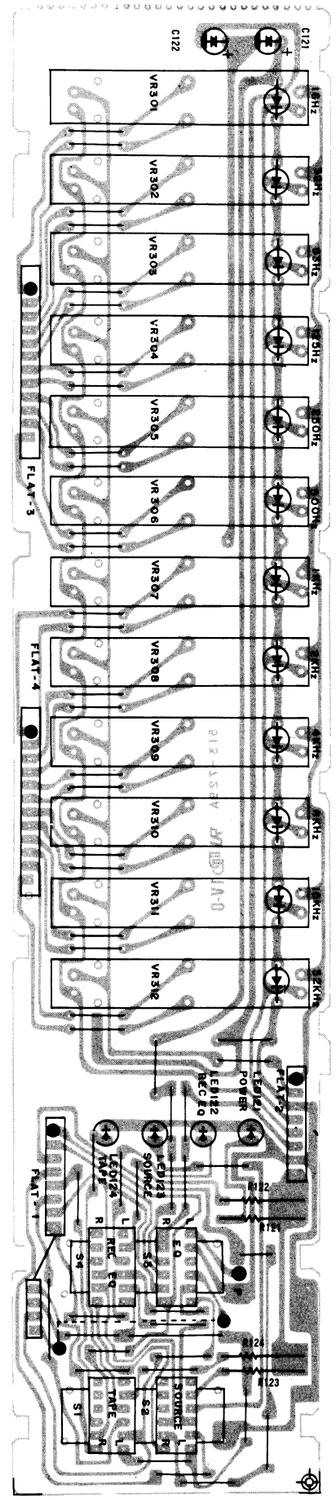
SW2 P. C. BOARD



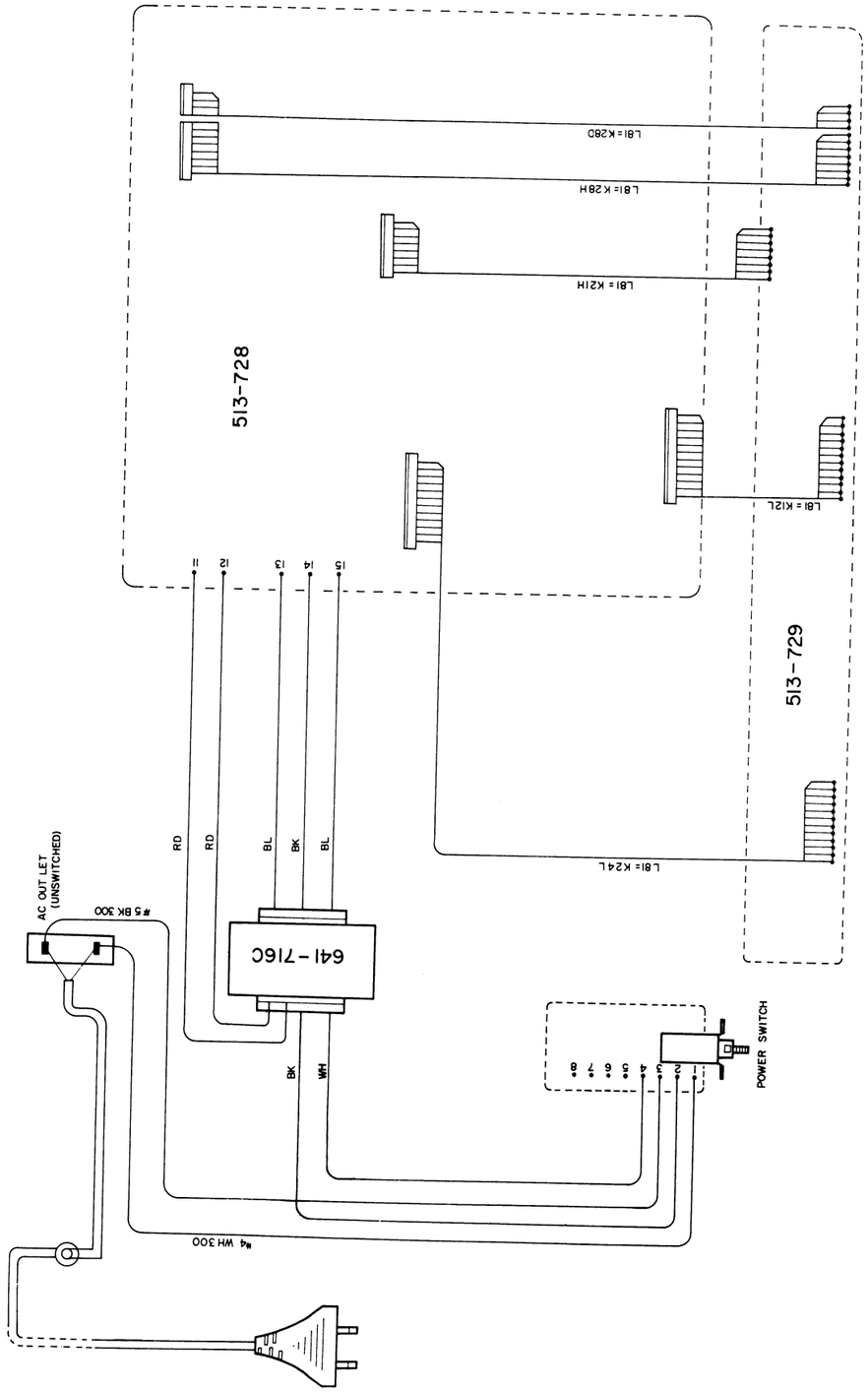
- MAIN P.C. BOARD



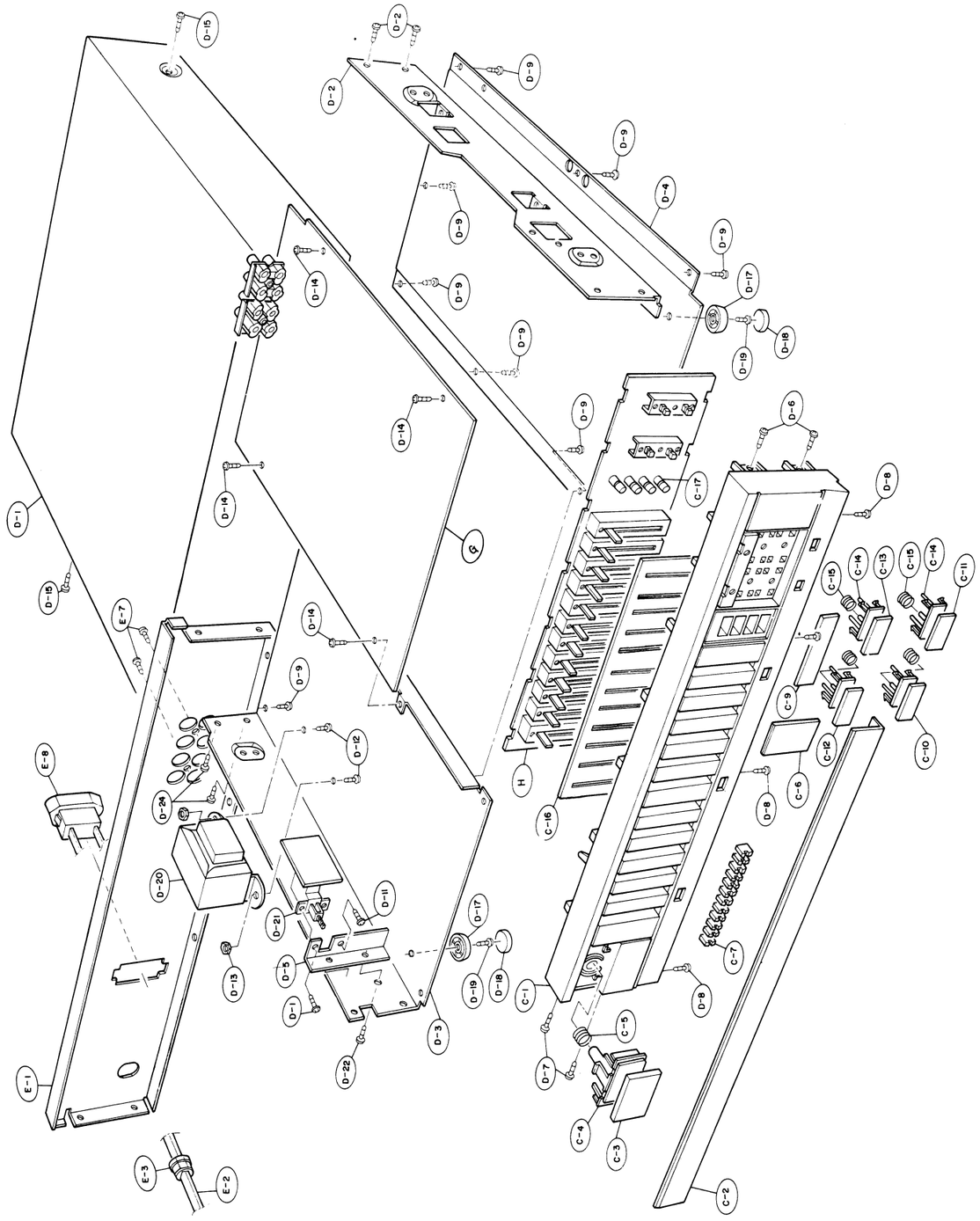
SW I
P. C. BOARD



WIRING DIAGRAM



EXPLODED VIEW



REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTICE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the safety precaution of this service manual, don't degrade the safety of the receiver through improper servicing.

• ELECTRICAL

Location No.	Part No.	Description
INTEGRATED CIRCUITS TRANSISTORS		
IC101-312	668-051B	IC, KIA7558P-OP AMP
TR101	665-708A	TR, KTD526-O
TR102	665-812B	TR, KTC1815-Y
TR103	665-830B	TR, KTC2120-Y
TR104	665-831B	TR, KTA950-Y
TR301-306	665-817B	TR, KTC2240-BL
TR307-308	665-833B	TR, KTA817A-Y
TR401	665-812B	TR, KTC1815-Y
TR402	665-830B	TR, KTC2120-Y
DIODES		
D101	652-612A	Rect, 2W02
D102	654-724J	Zener, DZ20B
D103	654-013A	Zener, ZPD-24
D110	652-612A	Zect, W005M
D401-402	652-005D	Rect, DS4002
LED121-124	653-636D	LED, SLR54GC3-H
MISCELLANEOUS		
VR301-312	612-621A	VR, SV308GPC1 15LB W50K
	554-633C	SW, Source/Tape
	554-633D	SW, EQ/REC EQ
	576-002A	Jack Block S-437P-Line/Tape
	557-011B	Relay, RY12W-Y

• CABINET

Location No.	Part No.	Description
C-1	258-523A	Panel Front
C-2	246-530P	Decoration Front
C-3	273-529A	Knob, Power
C-3-2	324-331A	Holder, Power-Knob
C-5	442-634X	Spring Power Knob
C-6	235-520C	Window Led
C-7	273-517A	Knob EQ Band Vol
C-9	273-510A	Knob Decoration
C-10	273-511F	Knob Decoration Tape
C-11	273-511L	Knob Decoration Souce
C-12	273-511M	Knob Decoration EQ on
C-13	273-511N	Knob Decoration EQ Rec
C-14	324-511A	Holder Knob (B)
C-15	442-635B	Spring
C-16	221-989A	Cover Slide Vol Switch
C-17	324-321A	Holder, Led Guide
D-1	213-520A	Cabinet
D-2	315-510A	Frame Side
D-3	313-510B	Cassis Bottom
D-4	256-520B	Plate Bottom
D-5	321-410A	Bracket Power Switch
D-6	TRQ1830J	Screw, TRQ2+3x6A (Front-Frame Side)
D-7	TRQ1830J	Screw, TRQ2+3x6 (Front+Chassis Bottom)
D-8	TRQ1830J	Screw, Tapping TC3+3x6 FZMY (Front+Chassis Frame, Plate Bottom)
D-9	TRR1830J	Screw, TRR3+3x6 (Plate Bottom+ Chassis, Frame Back)
D-11	MRC1830J	Screw (Fix Powr SW)
D-12	MRC1836J	Screw, MRC+3x8 (Fix Power Trans)
D-13	NHA1800J	Nut, NH1-3 FZMY (Fix Power Trans)
D-14	TRQ1830J	Screw, TRQ2+3x6A (Fix Main PWB)
D-15	353-633A	Screw, Special (Fix Cabinet, Side)
D-17	265-027A	Foot
D-18	472-610D	Felt (Under Foot)
D-20	641-716C	Trans Power 220V 50Hz
D-21	554-612B	Switch Power
D-22	TRQ1822J	Screw, TRQ2+3x4A (Fix Bracket Power Switch)
D-23	TRQ1830J	Screw, TBQ+3x6 Fzmy (Frame Side +Pannel Back)
D-24	TBQ1830J	Screw TBQ+3x6 Fzmy (Chassis Bottom+Pannel Back)
D-25	TRQ1822J	Screw TRQ2+3x4A (Fix Bracket Power Switch)
E-1	258-982C	Panel Back
E-2	681-004F	Power Cord
E-3	324-348A	Holder, Cord
E-7	TRQ1830I	Screw, TRQ2+3x6A FBK
E-8	565-004B	AC Out-Let
G	511-728B	PCB Ass'y, Main
G-16	255-107B	Heat Sink
G-17	TRQ-1830J	Screw, TRQ2+3x6A (Heat Sink+TR101)
H	511-729A	PCB Ass'y, Switch